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HEARINGS

BEFORE THE

U.S.
**SUBCOMMITTEE OF THE COMMITTEE
ON APPROPRIATIONS, HOUSE OF
REPRESENTATIVES**

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CONSISTING OF

Messrs. WALTER I. SMITH (chairman), J. V. GRAFF,
F. H. GILLETT, SWAGAR SHERLEY,
and J. J. FITZGERALD

IN CHARGE OF

THE FORTIFICATION APPROPRIATION BILL

CONCERNING

**THE COST OF PRODUCING
ELECTRIC CURRENT**

WASHINGTON
GOVERNMENT PRINTING OFFICE

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COST OF PRODUCING ELECTRIC CURRENT.

Hearings conducted by the subcommittee, Messrs. W. I. Smith (chairman), J. V. Graff, F. H. Gillett, Swagar Sherley, and J. J. Fitzgerald, of the Committee on Appropriations, House of Representatives, in charge of the fortification appropriation bill.

TUESDAY, *May 12, 1908.*

Subcommittee called to order at 10.30 a. m., Hon. Walter I. Smith presiding.

STATEMENT OF MR. ALBERT F. DAWSON, A REPRESENTATIVE FROM THE STATE OF IOWA.

MR. SMITH. Mr. Dawson, you are a Member of Congress from Iowa?

MR. DAWSON. Yes, sir.

MR. SMITH. During the consideration in the Committee of the Whole of the sundry civil bill you were in possession of what purported to be some data as to the cost of production of electric current at the navy-yard, Washington. I will ask you to state where you obtained that information, and how you came to have it, if you will.

MR. DAWSON. Well, would it be just as satisfactory to the committee for me to go ahead and make my statement in my own way?

MR. SMITH. I would a little rather you would answer the question that I have just asked.

MR. DAWSON. I have a statement in my hand which I have just confirmed this morning with Admiral Leutze, of the navy-yard, and it was found to be absolutely correct.

MR. SMITH. You are a member of the Naval Committee of the House?

MR. DAWSON. Yes, sir.

MR. SMITH. Do you have any objection to answering my question as to who enlisted you in this inquiry?

MR. DAWSON. I do not know that it is an entirely pertinent question.

I was invited here this morning, as I understood it, to consider with you the subject of "the cost of production of electric current in the District of Columbia." As a member of the Naval Committee—following the policy of the Committee on Appropriations, which I think is a good one, of scrutinizing the action of other committees—I gave some consideration to the question of section No. 9 of the sundry civil bill as it would apply to the navy-yard, with the result that I have this statement as to the cost of production of electric power at the navy-yard; and I can say to you that this is an official statement; that it was prepared in the navy-yard, and is approved by the commandant

of the yard. It was prepared by the chief electrician of the yard from the figures on his books.

I will say to the committee that I submit this statement on my own responsibility, backed by the authority of the commandant of the navy-yard. Is that sufficient for the committee?

Mr. SMITH. Now, Mr. Dawson, as I have stated, we do not desire to ask you or force you to answer embarrassing questions, and we have no right to force you to answer any questions. Do you wish this committee to understand that in undertaking to have an investigation of the price of electric current you were actuated entirely by your membership on the Naval Committee and were not approached by anybody on the subject?

Mr. DAWSON. Oh, no; I do not intend to say that at all. As a member of the Naval Committee I meet many people who are interested in naval subjects, and as such this matter was brought to my attention.

Mr. SMITH. I think it is important for the committee and for Congress to know that the employees of the Government are making a concerted effort to prevent the purchase of current from outside concerns, and assert that the current can be produced as cheaply by the Government by maintaining a large force for that purpose in the Government employ.

Mr. DAWSON. I can say to you very frankly that no Government employee approached me or brought the matter to my attention.

Mr. SMITH. You did not receive it through official sources in the first instance?

Mr. DAWSON. No, sir; but I will say that I have verified it through official sources, so that the subject-matter of it is official.

Mr. SMITH. Do you personally know how the appropriation is made, from your experience upon the Naval Committee, and out of which the expense for this current is paid?

Mr. DAWSON. At the navy-yard?

Mr. SMITH. Yes.

Mr. DAWSON. No; not in detail.

Mr. SMITH. Are you able to say whether the appropriation for current can be distinguished from the appropriation for other purposes at the navy-yard?

Mr. DAWSON. No—that is, in the appropriation bill, or by the persons who expend the money?

Mr. SMITH. I am now speaking of the appropriation.

Mr. DAWSON. No; I think not.

Mr. SMITH. So that the question of what the current costs at the navy-yard must of necessity be a question largely of bookkeeping, is it not?

Mr. DAWSON. It is a matter of record.

Mr. SMITH. As to what part of the expense they charge to current and what part to heat, if they are using the same boilers?

Mr. DAWSON. I understand these figures are for power and light alone and not for heat at all.

I might add that the statement which I have here, showing the cost of production of electric current at the navy-yard, includes a percentage for deterioration of plant, and a liberal percentage also for maintenance of plant.

Mr. SMITH. Do you know what percentage is charged for deterioration?

Mr. DAWSON. Ten per cent on the figures I have here, and 10 per cent for maintenance, so that it puts the figures of production practically on a commercial basis, which I assume is what the committee desires.

Mr. GRAFF. Is not 10 per cent rather small for depreciation of a plant of that sort?

Mr. DAWSON. That would provide for reproducing the plant every ten years; that is, 10 per cent on the cost of the plant.

Mr. GRAFF. I have had a little experience in regard to electric-light plants, and I know that there is quite a considerable hazard in regard to accidents, because it is delicate machinery, and it is run at very high speed.

Mr. DAWSON. Undoubtedly your judgment would be far better than mine upon that, because I make no pretension of being an electrical expert.

Mr. SMITH. Is there anything further that you can say that would aid us in our investigation?

Mr. DAWSON. If you wish this cost—

Mr. SMITH. We would like to have that in the record. Whom do you say is in charge in the navy-yard in such a way as to be able to testify as to the details of the correctness of your statement? Your knowledge is from their statement to you, is it not?

Mr. DAWSON. The chief electrician at the yard.

Mr. SMITH. Who is that now?

Mr. DAWSON. I have forgotten his name, although I just left him a few moments ago.

Mr. SHERLEY. Did he prepare this statement that you have?

Mr. DAWSON. I think so. This is a statement from the records of his office.

Mr. SMITH. Are you able to state to the committee whether the parties who approached you upon this subject were acting in the interest of the Government employees or whether they were simply acting from a desire to promote the interests of the Government?

Mr. DAWSON. No; I can not.

Mr. SMITH. Is there anything further that you wish to state, Mr. Dawson?

Mr. DAWSON. No, excepting this: I do not like to be put in the attitude before this committee of being actuated by any improper motives in this matter.

Mr. SMITH. We do not suspect anything of that sort, Mr. Dawson.

Mr. DAWSON. I have observed the attitude of members of the Committee on Appropriations as measures come in upon the floor of the House, wherein they take it upon themselves—and I think properly, too—to scrutinize and criticise the legislation which comes from other committees. As a member of the Committee on Naval Affairs I believe it is a part of my duty to scrutinize and criticise any legislation from any other committee which may have an effect upon the Navy Department or the naval service generally, and this item relating to the electric power in the District of Columbia is one in which a great naval institution is vitally interested.

Mr. SMITH. Very much so.

Mr. DAWSON. And it seems to me that it is entirely proper for a member of the Naval Committee to examine into the question.

Mr. SMITH. No doubt of that.

Mr. DAWSON. I do not know exactly the motives of the person who brought this matter to my attention. I think, however, that he had at heart not only the public good and the interests of the public service but also the interests of the Government in bringing it to my attention.

Now, to get down to the actual cost of production of electric power at the Washington Navy-Yard, I would like to ask the chairman, before I proceed, whether he desires me to touch also upon the question of what effect the proposed amendment—because I assume that section 9 is the general basis upon which this hearing is being held—would have on the service at the navy-yard; and whether or not the chairman desires me to give to the committee the additional cost to the navy-yard which would follow under the provisions of that section.

Mr. SMITH. Well, in a sense, you are right, Mr. Dawson; that is to say, section 9 of the sundry civil bill was prepared at a time when the evidence before the committee showed that the minimum cost of any electric current required by the Government was about 3 cents, and from that up to 15 cents; and that the price in section 9 was below the minimum and very greatly below the maximum. It is now being claimed that the information given the committee was erroneous, and we want to know the truth; we want to know the cause of the bias, if there is such, upon the part of the witnesses on both sides. We realize, of course, that if the representative of the electric company is before us he is biased, and we realize also that if a man has lost his position under the Government because of the reduction in the service-producing electric power he has his bias. We want to know the weight to attach to the testimony of every man, and that is all.

Mr. DAWSON. And likewise a man who is going to lose his job has a perfect right to state his case, to be heard and considered.

Mr. SMITH. He certainly has; but we desire to know if that is the reason why there should be resistance to the reduction of the Government force, so far as his side is concerned, the same as General Harries's testimony would relate to his side. We want to know the weight of testimony in every instance. We cordially approve of your action as a member of the Naval Committee in trying to safeguard the interests of the Government at the navy-yard.

Mr. DAWSON. I trust the committee will take it for granted that I have no bias whatever. I have a public duty to perform, and I am endeavoring to perform it.

Mr. SMITH. No doubt of it.

Mr. DAWSON. Now, the figures taken from the books of the chief electrician of the Washington Navy-Yard show that the present cost to produce current per kilowatt hour is 8.521 mills—less than 1 cent per kilowatt hour.

Mr. SMITH. Will you permit me to interrupt you at that point? Are you advised as to whether the navy-yard is the largest consumer of current as to power used of any Government institution around Washington?

Mr. DAWSON. I believe it is; I believe it is the second largest plant in the District as to size. My understanding is it is about one-third the size of the central power station of the Electric Company.

Now, that figure includes, as I said, a percentage for depreciation, and also for interest on the investment, and maintenance. The actual cost of the production there is \$0.00762, which would be 7.62 mills.

To that is added 10 per cent for depreciation of plant, which, as Mr. Graff says, may be a little low; and also 10 per cent, as I understand it, for the maintenance of the plant, which brings that figure up to the one I have previously named.

Mr. SHERLEY. What is charged in there in regard to labor; do you know?

Mr. DAWSON. No; not in detail; but I understand that that includes the entire force which has charge of the electrical department in the Washington Navy-Yard; but I may add, at this point, that it includes quite a considerable force, because they have a fire-alarm system there, dynamos here and there in the laboratories and at other parts of the yard, and if they were to change from their present system of independent plant and take their power from the outside, they would still be compelled to keep practically the same force there that they have now—a superintendent and men to look after the various little things. As was explained to me, the force which is required there is employed largely upon the little things rather than upon the larger item of the production of power itself.

Mr. SHERLEY. Then, should they be charged to the cost of production?

Mr. DAWSON. I think they should.

Mr. SHERLEY. If they are employed in producing electricity, they would not be employed if they were not producing electricity.

Mr. DAWSON. Of course, that would only make the showing less—

Mr. SHERLEY. It is not what effect it may have upon the book-keeping, but I want to find out what accuracy has gone into the making up of this statement.

Mr. DAWSON. I understand, and I am satisfied that this statement has been made up entirely on the side of conservatism and fairness.

Now, I have here a detailed statement of what the daily cost of maintenance of the plant is, and I will read it:

Itemized statement showing the cost per kilowatt hour of producing electric current in the navy-yard, Washington, D. C.

Coal consumed under 10 boilers, 63 tons.....	\$163. 80
Pay of 12 engineers, 3 shifts of 8 hours.....	43. 44
Pay of 2 laborers.....	3. 84
Attendance on boilers, 6 men, 8 hours each.....	13. 44
Lubricating oil.....	. 88
Cylinder oil.....	1. 36
Grease.....	. 10
Waste.....	. 60
Boiler compound.....	. 50
Depreciation of boiler and engine plants and general repairs on both.....	371. 75
Total daily cost.....	599. 71

Maximum output for each of four large generating units.....amperes..	2, 500
Maximum output of one smaller generating unit.....do.....	2, 250
Maximum output of one smaller unit.....do.....	500
Total maximum output of six units.....do.....	12, 750
Total kilowatts per hour (230 volts).....do.....	2, 932. 5
Total maximum kilowatt-hour capacity per one day of 24 hours.....	70, 380

Cost to produce current per kilowatt hour \$0. 008521

Mr. SHERLEY. Right there. Are those items as to the cost of employees what is paid them by the Government, or does it represent just a part of their pay?

Mr. DAWSON. I understand this represents their full pay.

Now, if you apply to that great plant down there the provisions of section 9, you get this result: That section, as I recall it, provided a pay of $6\frac{1}{2}$ cents per kilowatt hour for the first one million hours and $2\frac{1}{2}$ cents thereafter. If the navy-yard were to take the power upon that basis, they would then be at an extra expense on the first million hours of $5\frac{1}{2}$ cents per kilowatt hour, the difference between the cost to manufacture there and the purchase price, of \$55,000 on the first million hours. Their consumption there now is about 15,000 kilowatt hours per day. It is a little more than that, but figuring on that basis for 313 days in the year their average yearly consumption would be about 4,700,000 kilowatt hours. Of that amount, the additional cost of the first million hours would be \$55,000.

Mr. SMITH. That is a fallacy; there is nothing in that at all, Mr. Dawson. The first million hours is not chargeable to that at all in any practical sense. The Government is now buying a million kilowatt hours of current of this company at that price and is paying for it. It might possibly operate, understand me, to transfer a part of this 6 cents per kilowatt hour current from some other Department to the Navy Department, but the Government would not lose anything, and can put the whole of this in at $2\frac{1}{2}$ cents, and that is what it would amount to.

Mr. DAWSON. I should say in explanation that I have no familiarity with the electrical situation in other Departments. My knowledge is confined to the Washington Navy-Yard by reason of my membership on the Committee on Naval Affairs, and I was simply applying section 9 to that institution.

But leaving that \$55,000 aside and figuring the entire consumption at the minimum rate in section 9, you would have 4,700,000 kilowatt hours to be paid for at $2\frac{1}{2}$ cents per hour, which would be a net increase to that institution of a cent and a half per hour, or \$70,500. So that even on the basis of $2\frac{1}{2}$ cents per hour the increased cost to the Government would be \$70,500. The commandant of the yard does not know how that could be paid. If it were necessary to pay it, it would require an appropriation to meet that additional expense of \$70,500 a year as to the question of power at that institution alone.

Mr. SMITH. That is supposed to mean power and light?

Mr. DAWSON. Yes; power and light. Now, I think that practically covers the essential facts that I have in relation to the price of electric current at the Washington Navy-Yard, and unless there are some questions which the committee desires to ask—

Mr. SMITH. Mr. Dawson, the statement which was furnished you by some one, the one to whom you referred, as having been verified—

Mr. DAWSON. That is the statement I have read and put in the record.

Mr. SMITH. Yes. I think perhaps it might be well to give that to the stenographer and put it in the record and we will return it to you.

Mr. DAWSON. Very well.

Mr. SHERLEY. By whom was that statement verified?

Mr. DAWSON. It was verified this morning by the chief electrician of the navy-yard in conference with the commandant.

Mr. SHERLEY. How long a time did they spend in verification of the figures? What I mean by that is, when did you request them to verify the figures, and when did you get a final response of their verification?

Mr. DAWSON. Well, I called on the commandant this morning after receiving the invitation of the chairman to be present at this hearing, in order to be absolutely certain that what I had to say to the committee would be sound and without flaw. I called on the commandant of the yard this morning, and he called in the chief electrician, and also some other officer who has direct supervision over the electrical department, and who went over these figures. He had the same statement prepared himself.

Mr. SHERLEY. Was there any examination of the books of the Department for the purpose of verifying these figures?

Mr. DAWSON. No; not this morning. As I understand it, this statement was originally made from the records of the chief electrician, and made by him; and, as I understand that you are to call him before the committee this afternoon, he can give you the details on this subject.

Mr. SHERLEY. I am simply endeavoring to identify the statement in this way. I did not understand that the statement had been made by the electrician of the navy-yard. When you stated that it had been verified by the officials, then I wanted to find out the extent of the verification.

Mr. DAWSON. It seems to me that the subject-matter of the statement is of greater importance to the committee than the manner of its preparation, or any of the lesser—

Mr. SHERLEY. That is true, with the supplemental statement that the accuracy of the statement determines entirely its value. Now, in order to reach that accuracy, inasmuch as the origin of the statement in the sense of who caused it to be prepared is not known to the committee, it is important to know how much verification the officials of the Department have made with respect to it.

Mr. DAWSON. I see.

Mr. SMITH. As I understand you, then, they had the same statement there this morning when you went there.

Mr. DAWSON. Practically. I did not compare it word for word; but the essential features are there. There are some things in this statement that I assume the committee does not desire to have, for instance, the maximum output for each of the four large generating units, 2,500 amperes; the maximum output of one smaller generating unit, 2,250 amperes; the maximum output of one small generating unit, 500 amperes; total maximum output of the six units, 12,750 amperes.

I am not entirely familiar with the details of operation of that plant, and I don't know that all of these units are in operation, but that is a question that I assume the committee has no business with particularly or does not care to go into.

Mr. SMITH. Well, that might affect to some extent the amount of depreciation, whether they had a plant in excess of needs. If they are using only one-fourth of the dynamos all the time, the wear and tear would not be as great as it would if they were using them all.

Now, do you understand that this current that they report was their capacity or their actual average production?

Mr. DAWSON. The 15,000 kilowatt hours per day?

Mr. SMITH. I think those are the figures; the amount is given there.

Mr. DAWSON. The amount that they use now is 15,000 kilowatt hours per day. It runs a little over that at times, going, I think, up to 16,000. That is the actual consumption at the plant to-day.

Mr. SMITH. Do you know whether they have meters there to show whether that is the consumption or not?

Mr. DAWSON. I understand they can measure the load at any time.

Mr. SMITH. The meter that I speak of is not a meter to measure the candle power, but to measure the load.

Mr. DAWSON. I understand so.

Mr. SMITH. They have that, as you understand it, installed as a part of the plant?

Mr. DAWSON. Yes.

Mr. GRAFF. I want to ask whether there was any difficulty about these figures on account of the fact that the electricity might be used for other purposes than making light, and whether that electricity is furnished by this plant at the Navy Yard.

Mr. DAWSON. I do not understand that they use any of it excepting for light and power.

Mr. SMITH. Do you know whether any of it is used for heat, generally speaking?

Mr. DAWSON. No, I think not. They have a connection there, the Admiral tells me, whereby they can use the exhaust steam for heat; but I do not think it is done to any extent in the Navy Yard, although I understand that it is done in other Departments.

Mr. SMITH. Of course, there is a system of electric heating, but I do not understand that any of the Government buildings or houses are heated by electric current, do you?

Mr. DAWSON. I do not.

Mr. SMITH. If that is all, Mr. Dawson, that you wish to state, then that is all, I think, the committee wishes to ask about at present, and we will ask Mr. Cary to take the stand.

STATEMENT OF MR. WILLIAM J. CARY, A REPRESENTATIVE FROM THE STATE OF WISCONSIN.

Mr. CARY. Mr. Chairman and gentlemen, Mr. Dawson has about covered the subject as thoroughly as I could.

Mr. SMITH. Mr. Cary, you are a Member of Congress?

Mr. CARY. Yes, sir.

Mr. SMITH. Have you seen certain articles that have appeared in the press as emanating from you on the subject of electric current?

Mr. CARY. I have seen them; yes.

Mr. SMITH. It was by reason in part of those articles that we asked you to appear here this morning in order that we might see what information you have on the subject. Does your information extend beyond the navy-yard?

Mr. CARY. I have some other information here——

Mr. SMITH. Did you interest yourself in this matter, or did some one interest you in it?

Mr. CARY. My attention was called to it as a member of the Committee on the District of Columbia.

Mr. SMITH. Was it by some one in the Government service, or out of the Government service?

Mr. CARY. Some one out of the Government service.

Mr. SMITH. Do you know what his motive was?

Mr. CARY. The motive was—I was told that they were selling the electricity cheaper now than this would make it.

Mr. SMITH. We are anxious to exhaust all sources of information. Is the party who brought this matter first to your attention able to give the committee any information on this subject?

Mr. CARY. I think he is.

Mr. SMITH. Are you willing to give his name?

Mr. CARY. Yes.

Mr. SMITH. Who is it?

Mr. CARY. Mr. Lorch—this is Mr. Lorch here [indicating].

Mr. SMITH. What is your business, Mr. Lorch?

Mr. LORCH. Chief engineer of the brewery.

Mr. SMITH. What brewery?

Mr. LORCH. The National Capital Brewing Company.

Mr. SMITH. Do you know in what way, Mr. Cary, Mr. Lorch became interested in this matter, aside from his general interest as a citizen of the District of Columbia?

Mr. CARY. I do not.

Mr. SMITH. In connection with that, what investigation did you make, Mr. Cary, in regard to the cost of current at different places, if any; and what is the basis of your information?

Mr. CARY. I asked Mr. Lorch if he could get me the figures and he said he believed he could, the figures as to the different plants, and some of them are those that Mr. Dawson quoted here this morning.

Mr. SMITH. Did he only get you the figures with respect to the navy-yard?

Mr. CARY. I have others. There is one that I had that I find I haven't got this morning, and that is the army and navy building.

Mr. SMITH. Do you mean the State, War, and Navy building?

Mr. CARY. Yes; the current that is furnished to the White House and the Treasury building, I think. In that statement it is claimed by the engineer that the current could be furnished for 1.47.

Mr. SMITH. During the winter season?

Mr. CARY. When they are making heat.

Mr. SMITH. But not during the summer season?

Mr. CARY. In the summer season they get it from the Electric Light and Power Company for 2.50. I asked General Harries that direct question—

Mr. SMITH. And that it is cheaper than they could produce it when they are not producing heat?

Mr. CARY. I believe so.

Mr. FITZGERALD. He has a contract, if it can be obtained. There is an agreement under which, commencing the 1st of July, he would be able to get it for the five summer months at 2½ cents.

Mr. SMITH. It is being installed now; it is not yet in the State, War, and Navy building. Have you any other data, Mr. Cary, that you received from this one gentleman?

Mr. CARY. I got some information from other gentlemen afterwards.

Mr. SMITH. But I wanted to clear this gentleman off first in order that we may see who to send for.

Mr. CARY. I could not say whether he gave me any more information or not, but I got some other information from other gentlemen afterwards.

Mr. SMITH. Have you ever had anything to do with electric current so that you have personal knowledge upon the cost of electric current, excepting as you acquired that knowledge from other sources?

Mr. CARY. As a telegrapher I had a fair idea about it, but—

Mr. SMITH. But they do not use the same kind of current. This is the alternating current, is it not, and as I understand it they do not use that current in the telegraph service?

Mr. CARY. I think they do use it in some of the telegraph companies.

Mr. SMITH. But that is the converted alternating current, the alternating current converted into a direct current.

Mr. SHERLEY. Did you have anything to do, in your telegraph experience, with the generating of that kind of current?

Mr. CARY. No.

Mr. SHERLEY. And your knowledge of the telegraph does not involve the knowledge of the generation of electricity?

Mr. CARY. No; excepting that they claim that it is much cheaper than the old style.

Mr. SHERLEY. What I was trying to get at was whether you have knowledge as an expert on the subject?

Mr. CARY. No.

Mr. SMITH. Now, I wish you would tell us of any other places from which you have obtained information as to the cost of current, either public or private, in the District; and with reference to each tell us who you obtained that information from in order that we may send for him or them, and see what they know about it.

Mr. CARY. I lived one year at the St. James Hotel. They make their own current, but I am not sure whether they make it all the year round or not. It is made at 2.3 cents, and is offered by the central station at 4.

Mr. SMITH. Mr. Godfrey is the gentleman who gave you that, and he is a gentleman who would be able to give information in detail.

Mr. CARY. Yes; he can. Mr. S. Kann Sons & Co.'s steam and electric plant—

Mr. SMITH. From whom did you get that information?

Mr. CARY. I think Mr. Godfrey got me that information also.

Mr. SMITH. What is the information from S. Kann Sons & Co.?

Mr. CARY. They make theirs at \$1.45.

Mr. SMITH. They make their own current?

Mr. CARY. Yes, sir; and the Willard Hotel make theirs at \$1.42.

The CHAIRMAN. Have you detailed statements from S. Kann Sons & Co. and the Willard Hotel?

Mr. CARY. Yes; they are here.

Mr. SMITH. Do they show how much is charged to depreciation, and the like?

Mr. CARY. I think so. You can have these.

Mr. SMITH. We will have them printed.

(Following are the statements referred to:)

Average daily operating expenses of isolated plant of St. James Hotel, Washington, D. C.

Coal.....	\$11.40
Oil, waste, and maintenance.....	.80
Water.....	.20
Attendance.....	7.70

Total.....	20.10
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Total average load, 62 horsepower; total electrical load, 35 horsepower. Electrical load equals 0.5695 of total load. Amount chargeable to generation of electric current equals \$11.36. Average load in kilowatt hours equals 501.6. Cost per kilowatt hour equals $\frac{11.36 \times 100}{501.6}$ 2.3 cents.

Average rate offered by central station equals.....	\$0.04
Cost of generation by isolated plant.....	.02.3

Saving.....	.01.7
Total saving per day, 501.6 x 0.017 equals.....	8.53

Yearly report of operating expenses of S. Kann Sons & Co.'s steam and electric plant from November 1, 1904, to November 1, 1905.

Salaries, engineer, etc.....	\$4,680.00
Coal.....	8,266.94
Oil, waste, and boiler compound.....	500.00
Carbons, lamp, etc.....	300.00
Hauling ashes.....	200.00
Water.....	60.00

Total operating expenses of entire plant.....	14,006.94
$\frac{14}{100}$ for elevators and other services.....	4,668.98
	9,337.86

Generated 636,700 kilowatt hours, at $3\frac{1}{2}$ cents per kilowatt hour (rate offered by central station).....	22,284.50
Expense of generating same.....	9,337.86

Leaving a profit.....	12,946.64
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Average cost of generating electric current per kilowatt hour, \$0.0145, besides heating own building free.

Cost per kilowatt hour of generating current in New Willard Hotel.

Charging entire expense of operating plant against the generation of current, the cost per kilowatt hour is $4\frac{1}{2}$ cents.

By careful observation it has been found that the elevators, refrigeration, machines; laundry, kitchen, etc., represent at least $66\frac{2}{3}$ per cent of entire load. Therefore amount chargeable to current equals one-third of $4\frac{1}{2}$ cents, or 1.42 cents.

Mr. CARY. I asked the gentleman if he could give me any other information on the small plants in the city to compare with.

Mr. SMITH. I notice in this statement regarding the St. James Hotel—you claim to have no information excepting as you got it from the engineers, and especially from Mr. Godfrey.

Mr. CARY. Yes; but I believe Mr. Snellings brought some of these.

Mr. SMITH. Are you able to identify the statements brought by each of these gentlemen?

Mr. CARY. Mr. Lorch brought me the navy-yard and the State, War and Navy building, and I think Mr. Godfrey brought the others.

Mr. SMITH. Did you receive any excepting from Mr. Godfrey, Mr. Lorch, and Mr. Snellings?

Mr. LORCH. Three of us worked together on this matter.

Mr. SMITH. The reason for my inquiries is that we wish to see whom we shall send for, and whether anybody else excepting these gentlemen named, who furnished you this information, should be called.

Mr. CARY. I asked one of the gentlemen to see if he could not get some more information from some engineers in the different Departments, but after that article appeared in the papers, they closed up like a clam and would not give out any further information.

Mr. SHERLEY. Who closed up like a clam?

Mr. CARY. These engineers in the buildings.

Mr. SHERLEY. That was what was reported back to you?

Mr. CARY. Yes.

Mr. SHERLEY. You did not see them personally?

Mr. CARY. No.

Mr. SMITH. Can you tell us of anybody else from whom you obtained this information for the basis of these newspaper articles, excepting the gentlemen named?

Mr. CARY. After it became known that we were trying to get these figures, Mr. Collins, of the Times, came over and said that he knew about it and said he was going to publish it, so I gave him the figures I had, and he got some more.

Mr. SMITH. Mr. Collins is a newspaper man, not a mechanical man?

Mr. CARY. I think so.

Mr. LORCH. He is a newspaper reporter, but he is quite experienced in this line.

Mr. SMITH. Are there any others, Mr. Cary, whose names you can give us, and who have information?

Mr. CARY. Yes, there is a gentleman who is representing Mr. Cortelyou, I think his name is Morningstar—do you know the gentleman's name who represents the Treasury Department?

Mr. SMITH. The Treasury Department buys its current, and it could not give us much information on the subject of production.

Mr. CARY. He is a tall gentleman, and I am pretty sure his name is Morningstar, but there is a gentleman by the name of Doherty—

Mr. SMITH. At the Treasury Department?

Mr. CARY. Yes, sir.

Mr. SMITH. Have you any other persons whom you can suggest from whom we can obtain information upon the cost of current?

Mr. CARY. I do not know that this gentleman would have anything to do with the cost of current, but he might give you some information as to why the Treasury Department recommended it. He is a little fellow—Woodville—I do not know his name.

Mr. SMITH. Do you not know his name so that we can identify him in some way?

Mr. CARY. He is some kind of a secretary to the Secretary, I believe.

Mr. SMITH. What did you mean by that a moment ago as to why the Treasury Department recommended it?

Mr. CARY. I don't know. He said that he had some information he might be able to give, and that is why I mentioned him.

Mr. SMITH. What is it that you refer to?

Mr. CARY. The recommendation by the Secretary as to the amendment which he wished to make.

Mr. SMITH. That was made after the bill had been introduced in the House, and was under consideration in the House.

Mr. CARY. It is addressed to Senator Allison, and he sent me the copy and said that I might, if I got a chance to introduce it there—

Mr. SMITH. Have you any other information that you can give the committee, Mr. Cary, that will aid it in ascertaining the truth about this matter?

Mr. CARY. Before the District of Columbia Committee I asked General Harries the question if he was not furnishing power at 2½ cents now to the Portland Hotel, the Ebbitt House, and the Raleigh Hotel, and he said he was.

Mr. SMITH. Are you sure it was not the Portner?

Mr. CARY. The Portland is what I have here. He said he furnished it at 2½ cents during the summer months. He told me that he furnished this current at 2½ cents. He called it the summer rate, and I believe that is why they put it at that rate.

Mr. FITZGERALD. He said that they generated power or current that had to be utilized, could not be stored; generated more than they could utilize themselves; and that they were glad to sell it at that rate?

Mr. CARY. Yes.

Mr. FITZGERALD. That is substantially the statement, as I recall it.

Mr. SMITH. You would not consider it any breach of propriety to deliver this to the reporter and have it printed?

Mr. CARY. Although I suppose Senator Allison has the original, I would rather ask the Secretary if he would object to it. I would like to put it in, but—

Mr. SMITH. It is similar to a letter received by this committee, but not quite identical.

Mr. CARY. That is a copy I made of it when he let me take it home to copy it.

Mr. SMITH. Suppose you do this; suppose you leave this here for the present, call up the Secretary, and ask him if he objects, and if he does we will not have it printed, but return it to you.

Mr. CARY. I will do that.

Mr. SMITH. Is there any further information that you can give us which will aid us in this search?

Mr. CARY. Unless you want to use this [handing paper to Mr. Smith]. I am willing to give the committee anything I have that will throw any light on the subject.

Mr. SMITH. This is a statement headed, "Minimum rates charged by central station and cost of production per kilowatt hours." It includes the Portland Hotel, the Ebbitt House, and the Raleigh Hotel. Where did you obtain this statement?

Mr. CARY. I think I got it from Mr. Lorch.

Mr. SMITH. You might mark this as an exhibit, in order to use it in the examination of Mr. Lorch when he comes on the stand.

Is there anything further, Mr. Cary?

Mr. CARY. I do not think there is anything further I can say. Of course Mr. Dawson covered the navy-yard.

Mr. SMITH. Of course we understand that you gentlemen who are members of the House of necessity only know, in the sense of hearsay, about this matter, but we wanted to use your information for the

purpose of getting track of the matter. If there is anything further you can say now as to a line of search, we would be glad to hear it.

Mr. CARY. I presume you will want to call the engineers of the different buildings.

Mr. SMITH. We have already summoned them, so far as we knew of them.

Mr. CARY. Has the engineer of the State, War, and Navy building been called in?

Mr. SMITH. I think that Captain Poole is at the head of it, and I do not think he is called as an engineer.

Mr. CARY. I said "engineer;" but I meant electrical superintendent, or whatever you may call him.

Mr. SMITH. What further information can you give us, if anything, Mr. Cary?

Mr. CARY. Well, I do not know of anything else unless you call in Mr. Collins, although I could give you these figures provided by Mr. Doherty. I asked what contracts the Government had at any other cities, and somebody made the statement that the Government is paying 10 and 12 cents in other cities—I believe General Harries—I am not sure who it was, now, and I would have to read the paper again. This is what Mr. Doherty gave me, and you can put it in the record if you wish to.

Mr. SMITH. Mr. Doherty of the Treasury Department?

Mr. CARY. Yes. New York custom-house, the Government has a contract with the City Electric Light Company from 4 cents per kilowatt hour for the first 50,000 kilowatts to 3 cents for all thereafter.

Mr. SMITH. You have no information as to how much of that would be at 4 cents? You have no knowledge of the consumption, so as to know whether they are paying substantially 4 cents or substantially 3 cents?

Mr. CARY. Four cents for the first 50,000 kilowatt hours.

Mr. SMITH. You have no knowledge of the consumption, so that you do not know whether they are paying practically 4 cents or 3 cents?

Mr. FITZGERALD. They could not tell that, because the building has not been open a year yet.

Mr. CARY. I do not know that. This is the contract they have. Chicago court-house and post-office, they have made a contract at 3 cents straight. Buffalo post-office, 4 cents straight.

Mr. SMITH. In Buffalo do they get current produced by water power?

Mr. FITZGERALD. All the current at Buffalo is produced by water power at Niagara Falls. The street railways are operated by current from Niagara Falls.

Mr. SMITH. Do you know anything about the relative price of coal at Chicago or New York as compared with the price at Washington?

Mr. CARY. I think I heard that mentioned at a hearing in the Committee on the District of Columbia, and that Chicago is a little dearer than Washington, it being claimed that Washington was nearer to the coal fields, and that they burn soft coal at \$2.56 or \$2.86 a ton; but just in a broad way I can remember of that figure being mentioned in connection with the gas proposition at the time it was up. Washington is a little cheaper on coal than Chicago; that is the way it was stated.

Mr. SMITH. And a little dearer than New York, do you think?

Mr. CARY. That point did not come up; I could not say.

Mr. SMITH. Oh, I misunderstood you; I thought you mentioned that. What other cities have you there?

Mr. CARY. Baltimore custom-house; they have a contract for 3 cents for the first 50,000 kilowatt hours, and 2½ cents thereafter. Those are the figures he gave me.

Mr. SMITH. You are aware, are you not, Mr. Cary, that a great many small buildings in the city of Washington are lighted under existing contracts with this company, rented buildings?

Mr. CARY. You mean the Government does that?

Mr. SMITH. As I understand it, yes.

Mr. CARY. I understand that there are some, but I did not know how many.

Mr. SMITH. And you are also aware that the current is always furnished much cheaper for large than small buildings?

Mr. CARY. I should judge so.

Mr. SMITH. Is there anything further you can give us?

Mr. CARY. I do not think of anything now, gentlemen. If I get hold of anything I will bring it to you. I will ask the Secretary of the Treasury if he will allow me to let the committee use that copy of that letter.

Mr. SMITH. That will be all right.

Mr. FITZGERALD. Where did you get the figures that you have upon the public buildings—from the Treasury Department here?

Mr. CARY. I got them from Mr. Doherty, who is the representative of the Secretary of the Treasury. He told me that the contracts are in the Secretary of the Treasury's office.

Mr. SNELLINGS. I was going to suggest that Mr. Doherty can explain that data.

Mr. SMITH. Then you had better take the stand first, Mr. Snellings.

STATEMENT OF MR. MILTON SNELLINGS, OF WASHINGTON, D. C.

Mr. SMITH. Your name is Milton Snellings?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. What is your occupation, Mr. Snellings?

Mr. SNELLINGS. Steam engineer.

Mr. SMITH. By that you mean stationary engineer?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. You are also fourth vice-president of the International Union of Steam Engineers?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. Mr. Snellings, may I ask you to state what the basis of your interest in this controversy is?

Mr. SNELLINGS. The basis of our interest—I say “our” interest, for we are representing the engineers’ union here. The basis is that we believe the price that is mentioned in this bill is away in excess of what it should be.

Mr. SMITH. Is that the only basis of your interest?

Mr. SNELLINGS. I will state—I would like to say this—that a while ago in questioning Congressman Dawson, I believe his name was, you asked about the same question, wanted to know something about

the number of men in the Government employ, and what his object was in keeping a large force in the Government employ——

Mr. SMITH. I did not mean his object.

Mr. SNELLINGS. I know you did not. I want to say that we have possibly one or two men employed by the Government who belong to our organization in the District of Columbia, and to let you know that we are not defending our own members.

Mr. SMITH. I would like to get, frankly and candidly, the reason that inspires the engineers' union to take an interest in this proposition.

Mr. SNELLINGS. The engineers' union is composed of engineers who make their living operating steam engines, and if this company or any other company can induce the officials of the Government to do away with the plants that they already have, and stop installing more—we would not object if they could furnish the current cheaper than the Government could operate a plant for, but we come here and are prepared to show that we can produce this current with isolated plants cheaper than this concern is furnishing it to the Government.

Mr. SHERLEY. If, however, we are able to get a contract that is cheaper than the cost of making the current by the Government, your organization would be in favor of the Government making such a contract, would it not?

Mr. SNELLINGS. I think, Mr. Sherley, that we are discussing the present bill——

Mr. SHERLEY. But what I want to get at is your attitude. I understood you to say, and I am only asking you frankly in order to get your viewpoint, that if the Government can save money by getting a contract which would be cheaper than the cost of making electricity itself, you would see no objection to making such contracts?

Mr. SNELLINGS. Providing that heating should be taken into consideration, of course.

Mr. SHERLEY. Assuming that the statement is accurate, that they can get a contract cheaper than they can furnish the electricity itself, then there would be no objection to making such a contract, would there?

Mr. SNELLINGS. My organization would undoubtedly examine thoroughly any amendment or any bill that was offered, and then, of course, I would be in a position to answer.

Mr. SHERLEY. Assuming, then, that an investigation by the organization showed that the Government would save money by making a contract to be furnished its electricity rather than generating it itself; in that event would there be any objection by your organization to the making of such a contract by the Government?

Mr. SNELLINGS. My organization would not object to anything that would save the Government money, anything in reason.

Mr. FITZGERALD. In other words, your objection is not to the contract, but to the terms of this particular contract?

Mr. SNELLINGS. Yes.

Mr. SHERLEY. That is what I understood you to say, and that is what I wanted to get at.

Mr. SNELLINGS. So far as the 6 cents is concerned for the first million kilowatt hours, I believe you said that that would not amount to anything, as the Government is already consuming that much current at that rate.

Mr. SMITH. That is the statement made to us.

Mr. SNELLINGS. I am not questioning the statement at all, but what I was getting at, it seems that the price is so much in excess of what it is manufactured for that it is a wonder you gentlemen, on considering the appropriations, have not installed plants in these places.

Mr. SMITH. They could not do that in every private residence and small place rented by the Government. I will state to you that I have a statement from the War Department showing that in the isolated plants established all over the country it costs them from 3 to more than 11 cents per kilowatt hour.

Mr. SNELLINGS. Then the civil service has proven to be a failure on that job?

Mr. SMITH. That is what we are trying to find out. You suggested that we call these other gentlemen, as they had more definitely looked the matter up than you have, and I will ask whether you have personally investigated any of these matters as distinguished from Mr. Godfrey or Mr. Lorch.

Mr. SNELLINGS. We went over this matter together.

Mr. SMITH. Did you obtain any of the contracts from the Departments?

Mr. SNELLINGS. No, sir.

Mr. SMITH. And all you have done is to look over these papers that we now have before us?

Mr. SNELLINGS. Yes; and being an engineer myself I understand—

Mr. SMITH. Were you ever charged with the fiscal operation of the administration of an electric-light plant; were you ever charged with the financial part?

Mr. SNELLINGS. I have been in full charge of electric-light plants; yes, sir.

Mr. SMITH. Where?

Mr. SNELLINGS. At the Portland, for one.

Mr. SMITH. The Portland apartment house in this city?

Mr. SNELLINGS. Yes, sir; and at the National Hotel.

Mr. SMITH. You are aware that with a single plant at the Portland they operate both their electric-light and power plant and an artificial-ice plant, are you not?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. So that in order to discover what the electric current costs there you would have to investigate as to what they charge themselves for the ice they get, would you not?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. Do you know what the electric current costs there? You say you were in actual charge of that work.

Mr. SNELLINGS. I do not know now; it was five or six years ago.

Mr. SMITH. You say you have been in charge of some other electric-light plants?

Mr. SNELLINGS. I was superintendent of the Pittsburg Wabash terminal electric plant installed there.

Mr. SMITH. Producing its own current?

Mr. SNELLINGS. Yes; and sells it to commission houses, office buildings, factories, and so on.

Mr. SMITH. In the Wabash terminal plant at Pittsburg do they operate a heating plant in connection with the generating plant?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. What system do they have—do they use the exhaust steam for the heating plant?

Mr. SNELLINGS. The exhaust steam; yes.

Mr. SMITH. Do they have to force the exhaust steam through the plant, or do they use a hot-water plant?

Mr. SNELLINGS. No; steam heat.

Mr. SMITH. Is it not a fact that almost invariably where exhaust steam is used for a steam plant, as distinguished from a hot-water plant, that the steam has to be forced by reason of the loss of heat in the generating of the electric current?

Mr. SNELLINGS. I do not understand what you mean by "forced."

Mr. SMITH. Practically pumping the steam.

Mr. SNELLINGS. Let me explain that to you. In the heating of a building, of course, we use exhaust steam—that is, in such plants as you speak of. The steam goes from the boiler at high pressure and operates the machine. The exhaust leaves at a certain pressure, whatever it may be, and circulates and heats the building, otherwise we would possibly throw that steam away.

Mr. SMITH. In using the steam for the purpose of generating the electric current, it loses about 5 per cent of its heat, does it not?

Mr. SNELLINGS. Well, it has to lose it anyway; you would have to reduce that steam anyway by a reducing valve.

Mr. SMITH. Well, it does lose 5 per cent, does it not?

Mr. SNELLINGS. The steam is radiating all the time.

Mr. SMITH. I am asking you as an expert. Do you know whether it would lose about 5 per cent in the production of the electric current?

Mr. SNELLINGS. Five per cent of the steam heat—a great deal more than that.

Mr. SMITH. How much do you say it would lose?

Mr. SNELLINGS. Well, that would depend upon conditions.

Mr. SMITH. Well, what would be the ordinary loss? Can you give us any idea at all about the loss of heat from the steam in using it to operate a dynamo through an engine?

Mr. SNELLINGS. I haven't the figures at hand for that, and I would not like to say unless I can give it correctly.

Mr. SMITH. Isn't it a fact that in all the most modern plants where they use that steam they now force the exhaust steam through in place of allowing it to go through by its own circulation?

Mr. SNELLINGS. They carry back pressure, if that is what you mean, some 5 or 3 pounds.

Mr. SMITH. It does not circulate as live steam would circulate?

Mr. SNELLINGS. Just the same, yes.

Mr. SMITH. You do not need back pressure if you are not using it.

Mr. SNELLINGS. You would have to have pressure. How would you get steam into the building if there wasn't any pressure?

Mr. SMITH. By the mere pressure of the generator.

Mr. SNELLINGS. If you were not running an engine, but taking steam direct from the boiler, you would have to have a given pressure by a reducing valve, which would be set possibly at 3 or 5 pounds, whatever would be necessary in that building; in other words, you must maintain a constant pressure.

Mr. SMITH. You do not want us to understand that you do not need any more back pressure to use exhaust steam than live steam, do you?

Mr. SNELLINGS. No.

Mr. SMITH. So that there is an increased cost in circulating exhaust steam in the maintenance of the back pressure, is there not?

Mr. SNELLINGS. Well, it has some bearing on that.

Mr. SMITH. Some expense?

Mr. SNELLINGS. Some expense.

Mr. SMITH. And it to some extent offsets the saving from using the steam twice, once for operating the engine and once for heating; that in some degree offsets that saving, does it not?

Mr. SNELLINGS. It is very small; very slight.

Mr. SMITH. You are not able to tell us anything that would give us a standard of what that would be?

Mr. SNELLINGS. We could figure that out if it was necessary.

Mr. SMITH. You are not able to give it now?

Mr. SNELLINGS. Not now.

Mr. SMITH. So that you would not be able to tell us what the net saving was from using exhaust steam over the use of live steam?

Mr. SNELLINGS. Some of the employers that I have worked for knew very quickly about the use of exhaust and live steam.

Mr. SMITH. But you are not able to give us anything further than a general statement as to the percentage of saving, or anything of that kind?

Mr. SNELLINGS. Not at present.

Mr. CARY. I would like to say that I called the Treasury Department up on the phone. I could not get Mr. Doherty, but I got Mr. Woodley, and he tells me that he is coming before the committee, and he said he would get the letter to Mr. Tawney.

Mr. SMITH. Those letters are not quite identical, and that is the reason I spoke of it to you.

Mr. CARY. Well, this can be copied off. Of course it is a copy of a letter addressed to Mr. Allison.

Mr. SMITH. I suppose if they are willing to give such a letter to an individual they are willing to give it to a committee of Congress. There is only a slight difference between that and the letter to the chairman of this committee, but I thought it was desirable to have them both in, that is all.

Mr. CARY. He said the copy was practically the same as the letter to Mr. Tawney.

Mr. SMITH. But it is not quite identical.

I understood you to say, Mr. Snellings, that aside from the Portland you had had charge of another electric light plant in the city?

Mr. SNELLINGS. Yes; the National Hotel.

Mr. SMITH. When was that?

Mr. SNELLINGS. Some time in the early fall or latter part of the summer of 1906, I think it was.

Mr. SMITH. Was that also a combined power and heating and ice plant?

Mr. SNELLINGS. Refrigerating; yes, sir.

Mr. SMITH. Did not make ice? They make ice at the Portland, do they not?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. Are you able to tell us what the cost of the electric current at the National Hotel was when you were operating the plant?

Mr. SNELLINGS. It would not be just fair to class the National Hotel

at that time with the conditions that exist there. I do not think it would be a fair comparison. There was no record kept, as there should have been, but it was very expensive there—not very expensive, but more expensive than it should have been on account of the condition of the boilers and engines at that time. They are producing the current much cheaper now. I believe they have some data on that subject now.

Mr. SMITH. There again we are confronted with the difficulty of distinguishing what the cost of the current is and the cost of the refrigerating plant, are we not?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. And that is true in many of our Government Departments; it is difficult to tell how much to charge for heat and how much for electric current, isn't that true?

Mr. SNELLINGS. We have formulas for figuring those things.

Mr. SMITH. Are they standard formulas?

Mr. SNELLINGS. Oh, yes.

Mr. SMITH. In print?

Mr. SNELLINGS. Oh, yes.

Mr. SMITH. Can you furnish us with those?

Mr. SNELLINGS. Yes; they are in text-books.

Mr. SMITH. We do not ask you to give us books, but if you could loan us such a table it would enable us to tell how you computed.

Mr. SNELLINGS. We will furnish you some information along that line.

Mr. SMITH. Is it customary to combine more than the different things we have talked about to-day—heating, electric current, refrigerating, and ice plants? Are those about all the things that are ever combined?

Mr. SNELLINGS. In some places we have laundries.

Mr. SMITH. Is the laundry at the Portland, for instance, conducted by the same boilers as at the Ebbitt?

Mr. SNELLINGS. Yes, sir.

Mr. SHERLEY. There is power used also for the operation of elevators?

Mr. SNELLINGS. Yes, sir.

Mr. SMITH. Where they have their own plant, a modern plant, do they use the current for power to elevators in place of the hydraulic elevators?

Mr. SNELLINGS. Some do and some do not. The electric elevator is not the most modern elevator.

Mr. SMITH. Do you regard the hydraulic elevator as the most modern?

Mr. SNELLINGS. I do; yes.

Mr. SMITH. Which is the more quickly responsive?

Mr. SNELLINGS. The hydraulic elevator, in my opinion, is the best elevator made.

Mr. SMITH. Is there a difference of opinion about that?

Mr. SNELLINGS. Manufacturers have differences of opinion, but I do not think engineers have.

Mr. SMITH. You think the engineers are in agreement that the hydraulic elevator is the more quickly responsive and the more rapid elevator?

Mr. SNELLINGS. Yes.

Mr. SMITH. Have you any further information that you can give us to aid us in this investigation?

Mr. SNELLINGS. I have not anything at hand.

Mr. SHERLEY. Mr. Snellings, your committee did not come to any members of the Appropriation Committee touching this contract?

Mr. SNELLINGS. I have not.

Mr. SHERLEY. There was a publication touching the probable terms of the bill in one of the local newspapers some time prior to the giving out of the bill. Did you know about the terms? When did you first learn about this proposed contract?

Mr. SNELLINGS. After it had been reported to the House by the committee and was published in one of our daily newspapers.

Mr. SHERLEY. Were not the publications in the Times and also in the Star considerably ahead of the actual giving out of the committee bill?

Mr. SNELLINGS. The first I ever heard of it. I did not know that.

Mr. SHERLEY. When did you first talk with Mr. Cary about it?

Mr. SNELLINGS. I first talked with Mr. Cary about it less than two weeks ago, after the bill was reported to the House.

Mr. SHERLEY. The reason I am asking these questions is this, that, speaking for myself, and I am quite sure that the other gentlemen will concur in what I say, we should have been very glad to have had information on a matter of this kind, and I should have been very glad to have had the statements that you gentlemen are now making as to the facts. How the Star received, in advance of any final action even by the committee, information of what was likely to happen I do not know, but I remember that that was the fact. But I am under the impression that Mr. Cary's interview in the Times was prior to the publication of the bill.

Mr. SNELLINGS. I will tell you. Our information was this: Two weeks ago to-night Mr. Godfrey called my attention and the attention of our organization to a clipping from one of the local papers, from the Sunday Herald of two weeks ago last Sunday. That is the first our organization ever knew about it. It was then reported to the House, and we immediately looked it up to find out just what the terms of the bill were; and you know the rest.

Mr. CARY. In the matter of the statement made by General Harries before the subcommittee of the District of Columbia?

Mr. SNELLINGS. Yes; that is the idea.

Mr. SHERLEY. The Star certainly published a statement as to what was being considered by the committee prior to the report of the bill.

Mr. SNELLINGS. We did not know it.

Mr. SHERLEY. I simply wanted to learn the facts, because I feel sure that a committee in a matter of this kind would be glad to have any information it could get.

You spoke of having experience in charge of various buildings. Did that experience include detailed knowledge of expenditures in connection with the generation of electricity, or were you just charged with the particular work of seeing that the machinery was properly run and the electricity properly generated?

Mr. SNELLINGS. I always knew what the cost of material or anything used in the place was.

Mr. SMITH. Did you keep books in any way so that you would carry the aggregate cost and the number of kilowatt hours?

Mr. SNELLINGS. Not in all places; no.

Mr. SHERLEY. Did you in any of them?

Mr. SNELLINGS. Not in the District of Columbia; no.

Mr. SMITH. I think we failed to ask you, and we ought to ask you in fairness, what the cost per kilowatt hour is at the Wabash terminal plant at Pittsburg; do you know?

Mr. SNELLINGS. That is a very large concern, and I would not like to say.

Mr. SMITH. I did not know whether you remembered or not, and if you did I wanted to give you an opportunity to put it in the record.

Mr. SNELLINGS. I do remember, but I would not like to say before this committee. The railroad company sells the current, and they have many competitors.

Mr. SMITH. What does it sell the current for; that is public I suppose; what does it sell it for to the surrounding country?

Mr. SNELLINGS. Two and one-half cents is the rate there.

Mr. SMITH. Now, in any of these plants that you have been connected with, did you keep any account or take into account the depreciation of the plant?

Mr. SNELLINGS. No; but about 10 per cent is the usual figure.

Mr. SMITH. It is a fact, is it not, that one of the greatest elements of depreciation in electrical machinery is its becoming obsolete.

Mr. SNELLINGS. Well, I don't know. Naturally it commences to deteriorate the day it is put in.

Mr. SMITH. I am not speaking of that form of depreciation. Isn't it a fact that in the twenty years since electrical apparatus has been extensively used in this country, that the depreciation of the value of plants has been very largely in their becoming obsolete in type, rather than wearing out?

Mr. SNELLINGS. Yes.

Mr. SMITH. Have not the very best of plants been thrown away entirely because of the advance of electrical science?

Mr. SNELLINGS. No, sir; not to my knowledge.

Mr. SMITH. You do not have any knowledge of that?

Mr. SNELLINGS. No, sir. It was not necessary to throw away any good plant.

Mr. SMITH. Isn't it a fact that when we passed from the old form of operation by belts connecting the engines with the machinery, to the direct connection, that the old plants were absolutely worthless, because the loss in operation was so great that it would more than pay interest on the new plant?

Mr. SNELLINGS. No, sir.

Mr. SMITH. Don't you know that they were abandoned everywhere in a large degree?

Mr. SNELLINGS. I don't know it. On the other hand, I know that they are not. At the Portland, that we have been speaking about, there is an old-style belted plant to-day.

Mr. SMITH. Isn't it a fact that the abandonment has been general in large plants?

Mr. SNELLINGS. I don't know of anybody who has abandoned it because of the improvement in electrical machinery. Sometimes possibly the output would increase, or they would need larger

machines, they would have to buy something, and when they bought they usually bought the latest type.

Mr. SMITH. They have abandoned two in my town in the last twenty years, and are now using the third one.

Mr. SNELLINGS. I do not know how many have been abandoned in this town, but we have worn out a good many. Possibly those were worn out that you speak of.

Mr. SMITH. Then your 10 per cent is not sufficient, if that is true. If in the case I spoke of, they are using the third one in twenty years, your 10 per cent is not sufficient.

Mr. SNELLINGS. Your plant might have been abused.

Mr. SMITH. Isn't it a fact that when they passed from the direct connection plant to the use of the alternating current, that practically all of the old plants were abandoned, so far as the very large plants are concerned.

Mr. SNELLINGS. They have not passed from it that I know of.

Mr. SMITH. Is not the alternating current now produced in a different way than under the old direct system with a direct connection with the generator?

Mr. SNELLINGS. They have always had the alternating current.

Mr. SMITH. Was it usual to use the alternating current with big plants?

Mr. SNELLINGS. They have always aimed to do that.

Mr. SMITH. Did they not, twenty years ago, use the direct current plant? You were trying to point out to us whether the progress from what they had to what they have has not resulted in depreciation.

Mr. SNELLINGS. No, sir; not to any great extent, though we know that where we have got to transmit power from an engine by means of a belt, to the dynamo, that it costs a little more; that is natural.

Mr. SMITH. And the large plant does not use the belt any more, does it?

Mr. SNELLINGS. Some of them do.

Mr. SMITH. No well-managed plant uses it. Is not the saving more than the interest on the investment, and therefore isn't it always uneconomical and unwise to use the belt system in a large plant?

Mr. SNELLINGS. Well, a direct system of course is more economical.

Mr. SMITH. Very much so, is it not?

Mr. SNELLINGS. Not very much so; no.

Mr. SMITH. What do you say the percentage of reduction of expense is, or increased energy, whichever way you want to put it?

Mr. SNELLINGS. In the average small plant it would be hardly noticed. You would have to take your plant as it is. Some plants would be more expensive than others, no matter what you do.

Mr. SMITH. Can you tell me as a skilled man in your business what the percentage of increased energy from coal is when there is substituted the direct connection for the belt system?

Mr. SNELLINGS. No, sir; I can not tell you.

Mr. SMITH. Unless there is something further you wish to tell us, I think that is all.

Mr. SNELLINGS. Nothing further.

STATEMENT OF MR. JOHN H. LORCH, OF WASHINGTON, D. C.

Mr. SMITH. You are president of the Central Labor Union of the District of Columbia?

Mr. LORCH. Yes, sir.

Mr. SMITH. What is your individual occupation at present, Mr. Lorch?

Mr. LORCH. Chief engineer of the National Capital Brewing Company.

Mr. SMITH. At the National Capital Brewing Company you have of course an electric plant?

Mr. LORCH. We make our own lights and have some few motors there.

Mr. SMITH. For what purpose do you use your boilers aside from the production of electric current?

Mr. LORCH. Cooking beer, running the ice machines, steaming beer in bottles, and so forth.

Mr. SMITH. And have refrigerating apparatus also as distinguished from making ice?

Mr. LORCH. Our ice plant is small, hardly worth consideration. Our main work is refrigeration.

Mr. SMITH. To maintain the temperature in the cooling room?

Mr. LORCH. Yes, sir.

Mr. SMITH. Does this make it difficult to tell the actual cost of the electric current?

Mr. LORCH. It would be more difficult to do it because the plant is of a cosmopolitan nature, so many using the steam, so that we have no opportunity to shut down one part and to make a test.

Mr. SMITH. You have taken an interest in this question of the letting of a Government contract. I suppose your reasons are about as those given by Mr. Snellings?

Mr. LORCH. Somewhat along the same lines. I agree with him in most of his views.

Mr. SMITH. You would not yourself be anxious to maintain Government plants at a cost in excess of what the Government could buy the current for simply in order to employ more men, would you?

Mr. LORCH. Well, I could answer that in my own way. I would not like to see the Government put in a larger expense than is necessary, but I believe these plants can be operated as cheaply as isolated plants in town can and that there would thereby be a saving to the Government.

Mr. SMITH. But if, upon the whole evidence, it turned out that a contract could be made, whether this one or some other, by which the Government could get the current cheaper by contract, then I understand that you have no objection to the Government letting its contract in that way?

Mr. LORCH. I have no objection to that, certainly. I believe that the service of isolated plants is better than you can get from the street service. I have noticed that very often in apartment houses the lights have fluctuated; in fact, in some buildings owned by my employers I have been sent to see why the elevator stopped, and I have simply found that the current has been shut off.

Mr. SMITH. The outside current?

Mr. LORCH. The outside current. I do not believe that the Government should be subjected to these variations and difficulties in the service.

Mr. SMITH. Certainly not, if it is anything like the same in cost. We will all agree on that.

Mr. LORCH. I believe the Government should have the best.

Mr. FITZGERALD. The best of what it requires for its purpose?

Mr. LORCH. There would hardly be any excessive cost in running the plant if properly attended to.

Mr. SMITH. Did you collect this data furnished to Congressman Cary?

Mr. LORCH. Part of that data I collected through the other members of the engineers' committee. Personally, my work has not been so much in collecting data as in trying to put it together in shape afterwards.

Mr. SMITH. Did you get any data excepting that which has been furnished to the committee?

Mr. LORCH. Yes; that one article.

Mr. SMITH. As to the State, War, and Navy building?

Mr. LORCH. No; but the data on the isolated plant of 1900, July, owned by the Potomac Electric Light and Power Company. I believe you have the copy there furnished by Mr. Cary.

Mr. SMITH. I do not believe I can identify the one you refer to. All of these places, the Portland Hotel—it is an apartment house more properly speaking—the Ebbitt House, and the Raleigh Hotel are very considerable buildings?

Mr. LORCH. It is the lower part that I personally furnished. I received that from an engineer with whom I am acquainted who worked for that company at that time; in fact, I have the original copy which he made as engineer in charge of the plant and he had to turn in every month. But he did not like to have his name used in the matter, because he has some idea of going back to work for that company, and if his name was mentioned he would not stand much chance to work again for General Harries.

Mr. SMITH. In this statement there is nothing to indicate that there was anything put in for depreciation.

Mr. LORCH. No; I did not see anything for depreciation.

Mr. SMITH. You are aware that in this report from the navy-yard far more is charged for depreciation and maintenance than for the expense of operation?

Mr. LORCH. I was very much surprised to see that; in fact, I can not realize how it could be so. Perhaps I am not far enough advanced. I had the same thing in my own plant. The bookkeepers insisted upon marking off 10 per cent every year for depreciation. I objected to that on the ground that I did not believe it could be correct, because if they knocked off 10 per cent every year, in ten years I would have no plant left there, according to the books. I maintained that they should allow for that percentage in repairs to the plant. It is unfair to charge the whole 10 per cent that way.

Mr. SMITH. At the navy-yard they charge 10 per cent for maintenance as well as 10 per cent for depreciation.

Mr. LORCH. I do not know upon what ground they base their figures.

Mr. SMITH. What I am trying to get at is that these figures as given here exclude what the Navy Department regards evidently as a very much larger portion of their expense.

Mr. LORCH. If they have been running ten years and knocking off 10 per cent every year, there is nothing more of their plant.

Mr. SMITH. My observation at my own home is that there is nothing left.

Mr. LORCH. Possibly that plant has been badly run. I am afraid that if any engineer in Washington ran his plant on that line he would lose his job.

Mr. SHERLEY. What do you consider ought to be charged for deterioration of plant?

Mr. LORCH. According to our bookkeepers, I consider that, on the face of it, to be large, to take 10 per cent off every year.

Mr. SHERLEY. I appreciate the force of the statement, and for that reason I was trying to arrive at what would seem to be a fair charge.

Mr. LORCH. Depreciation would be less than the cost of repair, because the cost of repair would naturally bring the plant up to the proper condition.

Mr. SMITH. If it is not obsolete.

Mr. LORCH. But every plant would differ on that point.

Mr. SMITH. But suppose you keep the plant up, a plant that was put in twenty years ago, keep it up absolutely. You would not regard it as worth anything now, would you?

Mr. LORCH. Keep it in good condition; certainly.

Mr. SMITH. Would you not regard it as entirely obsolete?

Mr. LORCH. No.

Mr. SMITH. And so expensive to operate that no wise man would run it?

Mr. LORCH. No, indeed.

Mr. SHERLEY. The point is this: A plant brand new, of a type of twenty years ago, may be, by virtue of loss of energy, so expensive in operation as to pay a wise man to discard it entirely, and yet the plant, as regards that type of a plant, might be in good condition.

Mr. LORCH. That would depend entirely upon the plant and the condition of a man's business.

Mr. SMITH. Don't you think that there has been a complete revolution in this machinery within the last twenty years?

Mr. LORCH. There has been some improvement. If I was putting in a plant, of course I would put in a modern plant.

Mr. SMITH. Could you run a plant of the type of twenty years ago and compete with a man running a modern plant?

Mr. LORCH. Certainly not; not a large plant in good condition.

Mr. SMITH. No matter what the condition?

Mr. LORCH. If both plants were in tiptop condition, naturally the modern plant would outclass the old plant.

Mr. SMITH. The progress has been very great in the last twenty years, hasn't it?

Mr. LORCH. Oh, yes.

Mr. FITZGERALD. There should be something charged off for depreciation, should there not?

Mr. LORCH. Yes.

Mr. FITZGERALD. In your opinion, from your experience, how much would you think would be a fair percentage to charge off?

Mr. LORCH. It would be impossible for me to give an average figure upon that, for I would have to take and figure on each plant and the condition it was in. The depreciation of a plant will be in accordance with its treatment.

Mr. FITZGERALD. Even assuming that it is well treated, you would have to mark off something for depreciation. Suppose a plant installed twenty years ago were to be disposed of because a concern was going out of business. It would have to be put in at a certain figure, a certain price. If it were in good condition, how much do you think it would bring—what percentage of the original cost?

Mr. LORCH. I would be unable to say that because it is a theoretical question, and I have not had occasion to figure on it.

Mr. FITZGERALD. But it is an important question to us who are charged with the duty of ascertaining these facts.

Mr. LORCH. I believe we would have to take off something, but I think 10 per cent is rather high.

Mr. SMITH. It may become high as the science grows perfect.

Mr. LORCH. I have never had occasion to use those figures at all.

Mr. SMITH. From whom did you procure this statement as to the New Willard Hotel?

Mr. LORCH. I believe that was gotten up by the committee, but which individual one I do not know. If I might be allowed, along this line, gentlemen, I would like to state that these isolated plants can be run as a better protection to the Government. If you take into consideration one general breakdown or smash up, and they had one here formerly by the Electric Light and Power Company, they practically put the city in darkness. If that should occur again, with one large power company, it would practically put the whole of the Departments out of commission; while if you had the isolated plants of reasonable size, and in a reasonable grouping of the buildings, the Government would be better protected.

Mr. SHERLEY. In that connection do not these commercial plants operate their plants with certain separate units so as to prevent the occurrence of just such conditions?

Mr. LORCH. Well, most every plant of any size will have a duplicate engine, I should judge.

Mr. SMITH. What is the percentage of duplication of machinery upon good plants?

Mr. LORCH. They keep a certain amount for accident or repair. Of course the large cities do not have to do so much, because they can get machinery quicker.

Mr. SHERLEY. They are in a position that where there is a breaking down of a generator they can transfer to another generator and continue the generation of the current.

Mr. LORCH. Some keep extra armatures on hand, which are the most liable part to be in trouble. Some do not and some do, according to the way you feel. The larger plants keep a certain amount of material on hand to take care of accidents.

Mr. SHERLEY. What do you think would represent a proper cost for the generating of electricity in a plant of some size; what would you call a large plant?

Mr. LORCH. A large plant; well, that is a wide—

Mr. SHERLEY. Very wide and necessarily so; but let us see if we can not narrow it. What would you consider as to the size of the plant such as is in the navy-yard?

Mr. LORCH. As I have seen the figures, I should say it would take about eight-tenths of a cent from the figures.

Mr. SHERLEY. Of course I wasn't asking as to what they are doing, but I am trying to get from you, as an expert, what you would consider ought to be the cost in a plant of that size. You think it is eight-tenths of a cent, do you?

Mr. LORCH. About 8 mills; yes. In fact, I believe the current generated at the power station of the plant of General Harries was about 3 mills, but that is only hearsay, however.

Mr. SMITH. You are aware that we are paying an enormous amount for rentals in Washington—\$480,000, if I remember rightly. It is impossible, surely, for us to install electric plants in these buildings that we temporarily rent as quarters?

Mr. LORCH. Certainly.

Mr. SMITH. So that we have got to have a great deal of commercial current in any event.

Now, have you taken that into consideration? We can not install the plants for all Government offices, because we could not put conduits in to connect small buildings with the large ones, even if it was wise to put in the large plants.

Mr. LORCH. Not all the small buildings, no; but I did understand that you are going to build a beautiful array of buildings from here toward the White House.

Mr. SMITH. Perhaps in a thousand years.

Mr. LORCH. I am not responsible for the rate that Congress does business.

As president of the Central Labor Union, I would like to state the views of that body; and that is that they feel it is rather unfair to those men employed in the Government buildings on these plants that they should be practically placed in competition with other concerns who are not paying, perhaps, as good as the Government is paying, because we have felt that the Government is not paying any too high a wage itself; in fact, we believe that Congress has not themselves taken that view as regards itself, not so very long ago, and we feel that they should not gauge the other men as being paid too much. If you are going to place these men in these plants in competition with the large power stations, with only a few men employed, and every condition not quite as good, it is helping to lower wages.

Mr. SMITH. Do you think it is fair to tax a man getting \$600 a year in a private plant in order that the Government may pay a man to do the same work \$1,200 a year?

Mr. LORCH. Do I understand that the Government is not paying more than \$600 a year?

Mr. SMITH. Oh, no. I am asking you now whether it is fair for the Government to pay more than the current wage, when it has to tax the man outside who receives a less wage in order to get money to pay that additional wage.

Mr. LORCH. Undoubtedly I do. I certainly feel that the Government should set a standard of wages for outside plants and that the outside plants should come up to those conditions.

Mr. SMITH. Do you think it is fair, when a man is working on the outside at the same job that another man is working upon for the Government, should be taxed in order to pay the man working for the Government a sum twice as large as he is receiving?

Mr. LORCH. I would feel that the percentage of increase upon that man's engineer's wages in this particular case would be so small he would never know it.

Mr. SMITH. In this one case; but we are talking generally about this proposition, whether it is fair to tax the people outside who are getting a smaller wage to pay a higher wage to a Government employee who has a permanent job and has many advantages over the man on the outside?

Mr. LORCH. I do not know that they are paying so very much more. I doubt if you will find many receiving as much pay as I am, and I receive \$800.

Mr. SMITH. In my State they would not be, that is true.

Mr. LORCH. My assistants get 21 and 19.

Mr. SMITH. We do not care to extend this discussion as to whether the Government employees are getting more; but the question is whether or not it is really fair, and I know there is a great deal of discussion about that, to tax people outside who have to hustle for their living and have no permanent job, in order to pay men in the Government jobs for the same identical work a very much higher wage.

Mr. LORCH. I do not think that was the view taken a short time ago in Congress when they raised their salary to \$7,500.

Mr. SMITH. Have you reason to believe that the gentlemen who raised the salaries of Members of Congress to \$7,500 are not worth it?

Mr. LORCH. Oh, no; I believe they are worth more.

Mr. SMITH. That is the proposition, whether they were earning that much outside, or able to earn that much outside.

Mr. LORCH. I believe that they are worth more, for I believe they are the most able men we have.

Mr. SHERLEY. What percentage of cost of operation does the pay roll bear in most of these plants?

Mr. LORCH. That would be difficult to say.

Mr. SHERLEY. I should think it would average much the same right along if you construct a plant of any size. Is not fuel the largest item of expense?

Mr. LORCH. Fuel is a large item; yes.

Mr. SHERLEY. Isn't it the largest item? That is where you get your energy from?

Mr. LORCH. It seems at the navy-yards that it is not the largest item.

Mr. SHERLEY. It also seems from the navy-yard statement and your statement, that there is an ideal condition there, and I judge that from so much for maintenance and repair; but what I am getting to is this, is not the labor cost in the generating of electricity, in its percentage, one of the lesser costs? Is not the big cost, or investment, for fuel and things other than labor?

Mr. LORCH. I believe fuel is one that you might say is almost the largest.

Mr. SHERLEY. What proportion does the labor cost bear to the total cost of making electricity?

Mr. LORCH. I have never had occasion to make those statistics.

Mr. SHERLEY. Have you any idea at all about it?

Mr. LORCH. I have never gone into statistical propositions of that sort.

Mr. SHERLEY. If the labor cost was slight, then the difference of wage in Government and in private employment would affect very slightly the difference in cost of electricity. For instance, assuming a case wherein the labor cost was only about 5 per cent, then if there happened to be a difference of, say, 10 per cent in wages, the only difference in cost of production of electricity in that case would be 10 per cent of 5 per cent, which of course would be a very minor sum.

Mr. LORCH. I believe, along the line of your questions, sir, that the Government can purchase and supply coal as cheaply as outside parties, and should not, therefore, take advantage of the difference of wages to throw people out of employment or to change the conditions.

Mr. SHERLEY. I did not mean to argue against your position at all, but what I was trying to get at was this: How much of the cost of making electricity by the Government and how much of the cost of making it by private individuals is caused by labor cost; in order to arrive at a fact, and with no ulterior motive whatever.

Mr. LORCH. I understand that, but I did not quite understand your proposition. Naturally a man in business runs his plant solely from a sheer cold-blooded point of view; business and nothing but business; and he will not employ a bit more help than he is compelled to employ. Whereas, we do not believe that the Government should take such a cold-blooded view of it.

Mr. SHERLEY. I am in harmony with you, but I just wondered how much the difference in labor cost affected the price. It would seem to me that it would not be very great.

Mr. LORCH. But it depends upon the plant. I do not believe it would make so very much difference. You may have too many engineers in one plant—excessive help, which will add to the cost—then in another case you may be short on some other plant; but if the average was shown, you would not find so much difference. Of course I would not like to say whose plants add too much for that cost, because it might put me in a bad position.

Mr. SMITH. I notice that at S. Kann Sons & Co. there is an item of \$8,266.94 for coal and \$4,680 for salaries, engineer, and so forth, the labor cost being something over 30 per cent of the total expenses.

Mr. LORCH. I believe they should have a little more help down there.

Mr. SMITH. And at the St. James Hotel the coal is put in at a daily average of \$11.40 and the attendance at \$7.70.

Mr. LORCH. That is a very small plant; they only generate about 35 horsepower.

Mr. SMITH. And the smaller the plant the more apt to be a high labor cost?

Mr. LORCH. It operates in inverse ratio there.

Mr. GILLET. Have you any idea what the proportion between labor and coal ought to be?

Mr. LORCH. To state what it should be is very hard; it is very hard to construct such an average. It would take a commission to go into all of this subject, because the price varies so much that it would be almost impossible to come to a conclusion.

Mr. SMITH. You do not know anything about the quality of the different Government plants, do you?

Mr. LORCH. I have never had an opportunity to go around, sir; but I would not mind being on a commission to go through them. I would enjoy it very much; I am very much interested in machinery, but I work every day, and it keeps me pretty busy.

Following statement is filed in connection with foregoing testimony of Mr. Lorch:

EXHIBIT I.—*Minimum rates charged by central station and cost of production per kilowatt hour.*

	Cents.
Portland Hotel.....	2½
Ebbitt House.....	2½
Raleigh Hotel.....	2½

Above hotels have isolated plants, and only use current from central station during summer months or during early morning hours, and do not have to use any specified number of kilowatt hours at 6 cents per kilowatt hour.

The average modern central station can generate the electric current for less than 1 cent per kilowatt hour. Below is some data extracted from a report of station G, Anacostia power station. This was a small plant, much smaller than the isolated plant in the average public building report for July, 1900:

Average output per day in kilowatt hours.....	1,599.2
Average cost per day for operation.....	\$26.97
Cost per day per kilowatt hour.....	cents.. 1.6

The average public building can, with its own plant, produce current at that rate when the cost of heating is considered.

STATEMENT OF MR. MORTIMER P. GODFREY, OF WASHINGTON, D. C.

Mr. SMITH. Mr. Godfrey, you are chief engineer at the St. James Hotel?

Mr. GODFREY. Yes, sir.

Mr. SMITH. You are a member of the International Brotherhood of Engineers?

Mr. GODFREY. Yes; I am secretary.

Mr. SMITH. And you personally collected much of the data given to Congressman Cary?

Mr. GODFREY. Yes; I collected some.

Mr. SMITH. You made this calculation for the St. James Hotel yourself?

Mr. GODFREY. Yes, sir; that is the average for the year.

Mr. SMITH. In this statement that you prepared for the St. James Hotel I do not see anything allowed for depreciation or maintenance.

Mr. GODFREY. I did not allow anything, because the plant has been in operation now for twelve years, and, allowing for depreciation in the past, I take it the plant has more than paid for itself.

Mr. SMITH. And there is nothing for maintenance. Does it not cost anything to maintain it?

Mr. GODFREY. Oh, yes, sir.

Mr. SMITH. There is nothing that I recognize in there for maintenance.

Mr. GODFREY. Yes; there is the second item there.

Mr. SMITH. Oh, yes; I beg your pardon—you are correct. That maintenance, though, you have figured at 80 cents?

Mr. GODFREY. Yes, sir.

The CHAIRMAN. Out of a total of \$20.10?

Mr. GODFREY. Yes.

Mr. SMITH. How do you explain the fact that at the navy-yard one-third of all the cost is put in for maintenance. On that basis it would make this cost for maintenance six or seven dollars.

Mr. GODFREY. I can not understand that in regard to the navy-yard. I think there is a mistake there in those figures. The plant is practically new, and the maintenance should be practically nothing. For the first four years the maintenance does not amount to anything; we count practically nothing for maintenance for the first four years.

Mr. SMITH. Your plant is not new, but you have got it in at almost nothing.

Mr. GODFREY. That is it exactly. I have not had an electrician in the place in four years, and very little machine work has been done. The only expense there has been is a little brickwork in the boiler and packing for the engines.

Mr. SMITH. Have you anything here to show the basis of your figuring on the St. James Hotel—what the total amount of coal consumed in a year is?

Mr. GODFREY. Yes; but I haven't got that with me.

Mr. SMITH. You brought nothing with you?

Mr. GODFREY. No.

Mr. SMITH. This is a computation you made from the records?

Mr. GODFREY. Yes.

Mr. SMITH. What is the nature of the St. James plant; is it a refrigerating plant?

Mr. GODFREY. No.

Mr. SMITH. Is it an ice plant?

Mr. GODFREY. No; there are no ice or refrigerating machines in there whatever.

Mr. SMITH. Is it a heating plant?

Mr. GODFREY. Yes; it is simply a heating plant.

Mr. SMITH. On what basis did you make your charge to the electric plant and to the heating plant?

Mr. GODFREY. We used to have this city current in there, and I ran that city current for ten days, and I found, on the basis I made those deductions there, I found that the percentage which was allowed there was what it took to run the plant there in addition to this lighting.

Mr. SMITH. If I understand you, then—and if I am incorrect I would like you to correct me—you took the whole cost of heating and lighting at one time?

Mr. GODFREY. Exactly.

Mr. SMITH. Then you took the heating when you had commercial current?

Mr. GODFREY. Yes.

Mr. SMITH. And subtracted that from the heating and lighting when you were running them both?

Mr. GODFREY. Yes, sir.

Mr. SMITH. And only allowed the balance for the lighting?

Mr. GODFREY. That is it; and the heating was not considered at all.

Mr. SMITH. So that your sole test is the difference between what it costs you to heat alone and what it costs you to heat and light during this experimental period?

Mr. GODFREY. That is it.

Mr. SMITH. What is your system of heating at the St. James; is it team or hot water?

Mr. GODFREY. Steam.

Mr. SMITH. Is it the direct system, with radiators in the rooms?

Mr. GODFREY. Yes, sir. I will state that it is a vacuum system.

Mr. SMITH. That is a very modern system?

Mr. GODFREY. We have practically no back pressure on the engine.

Mr. SMITH. The vacuum system is a comparatively modern system, is it not?

Mr. GODFREY. Yes, sir.

Mr. SMITH. So that that far your plant is modern?

Mr. GODFREY. Yes; the heating system is modern.

Mr. SMITH. It is only the electric system that might be said to be of ancient type?

Mr. GODFREY. Yes.

Mr. SMITH. Now, if you made this estimate in that way, how did you compute any maintenance at all of the electric machinery if you simply made that subtraction?

Mr. GODFREY. We have had no maintenance on the electric machines. We have a dynamo there with a brush on it now that was on it when I came there, and the renewal of a brush is all that would have to be done to a dynamo.

Mr. SMITH. Your system, if you will pardon me, of estimating depreciation is to accept the 10 per cent on this item, so as to assume it is all used up, and yet in other cases you reject a 10 per cent allowance for depreciation.

Mr. GODFREY. I am willing to allow 5 per cent.

Mr. SMITH. Either the 10 per cent is right or wrong.

Mr. GODFREY. Ten per cent is wrong; there is no question about that.

Mr. SMITH. Then you ought to have something in there for depreciation. The only reason you did not charge anything for depreciation was that it had been twelve years, and allowing that much, the depreciation had covered the cost of the plant?

Mr. GODFREY. Yes, sir.

Mr. SMITH. So it is only by accepting the 10 per cent, which was rejected by the other witnesses, that you got this statement up?

Mr. GODFREY. Yes; I will tell you why I accepted that. The electric company charges 8 cents a kilowatt hour, and our bill amounted to \$33 a day.

Mr. SMITH. I notice in this statement of S. Kann & Sons there does not seem to be anything allowed for depreciation.

Mr. GODFREY. That is another plant that has paid for itself. If the plant had not been established, they would have to pay more than the plant cost for the current.

Mr. SMITH. Either the 10 per cent is right or it is wrong.

Mr. GODFREY. Yes.

Mr. SMITH. If it is right, it ought to be in there; and if it is not right, something ought to be in there. Any plant depreciates to some extent.

Mr. GODFREY. Yes; but how do we know what that is?

Mr. SMITH. That may be difficult to tell, but I am pointing out that, while we can not perhaps reach it absolutely correctly, we know that this is not correct.

Mr. GODFREY. Yes.

Mr. SMITH. We know if there is nothing at all allowed for depreciation, that that is wrong.

Mr. GRAFF. Suppose a man would come in and buy this plant; that is, buy the property and pay what the valuation of the plant should be. Then there would be a depreciation.

Mr. SMITH. Is not the money invested in this plant worth 5 or 6 per cent?

Mr. GODFREY. Yes.

Mr. SMITH. As a matter of fact, are you not wrong in saying that if 10 per cent is right, it would all be used up in ten years? There is no charge here for investment of the money.

Mr. GODFREY. No.

Mr. SMITH. Five or 6 per cent of the 10 would be interest?

Mr. GODFREY. Ten per cent should cover both interest and depreciation.

Mr. SMITH. But 5 or 6 of it would be interest?

Mr. GODFREY. Yes, sir.

Mr. SMITH. That would leave over 50 per cent of your plant at the St. James still to be paid for?

Mr. GODFREY. Yes, sir.

Mr. SMITH. But there is none of it in these statements. So you do not think that is figured just right on the St. James plant?

Mr. GODFREY. I said I was wrong about that; that it was wrong to put that in there.

Mr. SMITH. But we want to put something in there. You think if 10 per cent was fair, that in ten years it was all used up. You see now that is not fair, because on this investment it would be 5 or 6, and even if 10 per cent were deducted for interest and depreciation there would be a lot of value in this plant, and depreciation going on and interest going on.

Mr. GODFREY. Yes.

Mr. SMITH. So there must be added somewhere in the neighborhood of 6 or 8 or some other per cent. That is correct, is it not?

Mr. GODFREY. Something ought to be added.

Mr. SMITH. Did you get any statements in your effort from any of these institutions that you investigated that were unfavorable to you, and therefore you did not turn over to Mr. Cary?

Mr. GODFREY. No, sir; I turned everything over that I got.

Mr. SMITH. So that you do not have any knowledge of these institutions that make a worse showing than these?

Mr. GODFREY. No, sir; I do not.

Mr. SHERLEY. You did not personally look into the cost of any of the Government plants?

Mr. GODFREY. No; I did not.

Mr. SHERLEY. And you have no personal knowledge of what it has cost them?

Mr. GODFREY. I made no investigation whatever of any of the Government's plants, for the simple reason that I thought perhaps the men in charge of those plants might be called into this, and for that reason I did not go near any of them.

Mr. SHERLEY. What is your judgment as to what the cost of electricity should be for a plant of fair size?

Mr. GODFREY. Any plant of over 300 horsepower should make their electricity in the neighborhood of a cent and a half at the most,

under the most unfavorable conditions; and you understand these plants are installed for the purpose of heating also, and therefore they are not installed in the most economic running condition for generating current only. These large plants condense their steam—the exhaust steam is condensed—and therefore they gain an additional pressure of the atmosphere equal to nearly 15 pounds per square inch, and that is why they make such a high efficiency showing. That is the reason the navy-yard can do it. They can make current just as cheap as any other central power station in the country. There is no doubt about it.

Mr. GILLETT. Is generating electricity one of the mechanical processes where a very great size of plant produces large economies, so that there is very much difference, say, between 500 horsepower and 2,000 horsepower? Is it very much cheaper to generate 2,000 than 500?

Mr. GODFREY. It is somewhat cheaper.

Mr. GILLETT. Is there a great deal of difference?

Mr. GODFREY. Not a great deal. If this 500 power is generated by one unit, it is not much cheaper to generate 2,000 horsepower, but if you are running three or four small units to generate the 500 horsepower it would be, but if you have one unit then it is not much cheaper.

Mr. GILLETT. After you get up to one good-sized unit it does not make very much difference after that?

Mr. GODFREY. That is it, exactly.

Mr. SHERLEY. You reach the maximum efficiency?

Mr. GODFREY. Yes; that is the reason the navy-yard has different-sized units.

Mr. GILLETT. What does a unit mean?

Mr. GODFREY. One machine.

Mr. GILLETT. I mean what machine is part of the machinery? I suppose the different parts of the machinery have to be united together to go into one unit. There has to be a just proportion between the engine and dynamo?

Mr. GODFREY. Yes; the boiler efficiency remains about the same for one, two, three, or four hundred horsepower.

Mr. GILLETT. Is there one big engine or dynamo?

Mr. GODFREY. That is it exactly.

Mr. GILLETT. Which is it?

Mr. GODFREY. Both taken together. You see, the engine drives the dynamo to generate the current.

Mr. GILLETT. And they have just one dynamo?

Mr. GODFREY. One big dynamo for a big engine.

Mr. GILLETT. And that is where the economy comes in, is it?

Mr. GODFREY. Yes; the larger the engine the greater the economy.

Mr. SHERLEY. In order that it may be in the record, will you explain what is meant by a kilowatt hour?

Mr. GODFREY. It is a unit of measurement for all electrical work, the kilowatt hour. It means a thousand watts for one hour, the consumption or generation of a thousand watts for one hour.

Mr. SHERLEY. What is the measurement of a watt in horsepower, or in some other term of energy?

Mr. GODFREY. Seven hundred and forty-six watts equal one horsepower.

Mr. GILLETT. What is a watt?

Mr. GODFREY. You might as well ask me what is an inch.

Mr. GILLETT. And the watt is an electric measurement?

Mr. GODFREY. Perhaps you have heard of amperes and volts?

Mr. GILLETT. Yes.

Mr. GODFREY. The two multiplied together make a watt. If one ampere goes through a wire at a pressure of one volt for one hour, that would be one watt hour.

Mr. SHERLEY. What are the terms of measurement for an ampere and a volt in horsepower, or can they be expressed that way?

Mr. GODFREY. Yes; the amperes times the volt, divided by 746, gives the horsepower.

Mr. SMITH. I thought that the greatest economy known in this system is where you use your exhaust steam for the back pressure for heating, that you got more out of your exhaust steam that way than you could by recondensing it and reheating it, and using it for current. Am I wrong in that?

Mr. GODFREY. To a certain extent you are right. You see, a building must be heated seven or eight months in the year. This steam must be supplied to it in some form or other. If we take it directly from the boiler, it takes just as much steam as if we run it through the boiler first at a high pressure.

Mr. SMITH. Not quite as much, does it?

Mr. GODFREY. I don't believe it would vary 3 per cent.

Mr. SMITH. I put it at 5 a while ago, which was a figure I obtained somewhere. You think it would not reach 5?

Mr. GODFREY. I hardly think so, not from experience. I have made no investigation of this matter.

Mr. SMITH. There is no doubt that live steam circulates better than exhaust steam, is there?

Mr. GODFREY. There is a doubt in my mind; I don't believe there is any difference. Steam is steam; the only reason we call it exhaust is because it is exhausted from the boiler.

Mr. SMITH. But if you take it live at the boiler, at the same temperature that you turn it into the engine, you get more effective operation for your heating plant, do you not?

Mr. GODFREY. Very little.

Mr. SMITH. And you can not give us that in percentage, you say?

Mr. GODFREY. I say I do not believe there would be over 3 per cent difference.

I would like to state before you close that you will note the great difference in the cost of production and the rate charged by the central station, so that even if we had an allowance of 10 per cent for interest and depreciation it will still bring the rate way below what is offered by the central station.

Mr. SMITH. The chief point would be with me not how cheaply the Government could produce it, if the Government business was conducted like private business, but in practical effect, does the Government produce it substantially as cheap as it can be bought from a private company? I say substantially. I understand the Government ought to pay a little something for not having the current broken between the commercial power house and its building, and things of that kind; but after all it ought to be approximately as cheap as it can be produced by a commercial company.

Mr. GODFREY. Exactly so. If not, it is because there is something wrong in the management of the plant.

Mr. SMITH. Then the question is whether we can correct that or not. In a great many Government works we find it is not practical to get good business management. That is unfortunate, but still it is true. If, on long experience, we find we can not produce it as cheap as we can buy it, I am personally in favor of buying it, but I am willing to pay a little more to get these things you have suggested, in the way of security.

Mr. GODFREY. Would you also be in favor of paying for the clerical work? I believe my own company would be willing to submit figures for contracting—

Mr. SMITH. The trouble is in letting out clerical work, which carries with it a responsibility for its accuracy, there would be times when the Government would pay more for it to its employees rather than to intrust it to somebody else to do it by contract.

Mr. GODFREY. It might turn out like the audit system.

Mr. SMITH. Well, the audit system has done good, with all its failings. It has not been without its instruction to the Government; it has not been wholly wasted. I do not think it is a very feasible, practical system, from all I hear.

I will put in this letter from the Secretary of the Treasury to Mr. Tawney.

TREASURY DEPARTMENT, OFFICE OF THE SECRETARY,
Washington, May 5, 1908.

HON. JAMES A. TAWNEY,

Chairman Committee on Appropriations, House of Representatives.

SIR: Referring to my letter dated February 21, 1908, addressed to the Speaker of the House of Representatives, relative to the purchase of electric current for Government buildings in the District of Columbia, and also to section 9 of the sundry civil bill, H. R. 21260, I have the honor to invite your attention to the following statements and recommendations:

It is manifestly more favorable to the Government to purchase all electric current which can not be more advantageously produced by the United States, under a single contract of the character described in section 9 of the bill referred to above.

The acceptance of such terms, however, would involve the discontinuance of the isolated electric generating plants now installed in the following buildings:

State, War, and Navy building, including the White House; city post-office, Bureau of Engraving and Printing, Municipal building, Monument, Interior Department, including the Patent Office, old Post-Office, and Pension Office; Library of Congress, Government Printing Office, Bureau of Standards, navy-yard, etc.

In certain of these isolated plants it is possible that a slight saving might be made by purchasing electric current at the proposed rates. In the larger plants, however, such as are installed in the Bureau of Engraving and Printing, Government Printing Office, navy-yard, etc., current is now produced at a very low unit rate, approximating one-half of the proposed rate, taking into consideration the use of exhaust steam for heating service and other economies effected by the consolidation of the heating, lighting, and power plants.

Moreover, the plants referred to represent an investment approximating in the aggregate \$500,000. This investment, if abandoned in order to secure the benefit of the terms proposed by the Potomac Electric Power Company, would remain idle and unproductive, and the fixed charges of this investment, which are now included in the estimates of cost of production, would have to be added to the gross amount paid by the United States for all electric current purchased, in order to determine the relative cost of the present method of combined purchase and generation with that resulting from the exclusive purchase of all electric current.

In view of these facts it is hardly conceivable that it will be to the interest of the United States to abandon its present investment in electric generating apparatus and to discontinue the operation of the plants installed for this express purpose on the basis of the rates proposed.

Therefore, in order that the Government may continue to receive the benefits accruing from the operation of certain of the isolated electric-light plants in its larger

buildings within the District of Columbia, if it is found that power can be produced by this means at a less cost, I have the honor to recommend that the Secretary of the Treasury be given greater latitude by changing the language of section 9 of the act and inserting on page 176, line 1, after the words "United States," "and such other buildings owned or occupied by the United States or hereafter constructed, where, in the judgment of the Secretary of the Treasury, electric current can be produced to greater advantage by isolated electric generating plants," and by inserting in line 2, after the words "rate of," the words "not more than," and by striking out in line 3 the word "at," so as to read as follows: "payment for such current to be at the annual rate of not more than six cents per kilowatt hour for the first million kilowatt hours and two and one-half cents per kilowatt hour for each or every part of each succeeding kilowatt hour."

With the changes as recommended herein, section 9, beginning on page 175, line 19, would read as follows:

"That the Secretary of the Treasury is authorized to enter into a contract for furnishing to the United States all electric current used for any purpose whatsoever, except for the lighting of streets, avenues, alleys, or highways, in or in connection with any and all buildings within or in the vicinity of the District of Columbia owned or occupied by the United States or owned or occupied by the District of Columbia excepting only such buildings as may be occupied by the Congress of the United States, and such other buildings owned or occupied by the United States or hereafter constructed, where, in the judgment of the Secretary of the Treasury, electric current can be produced to greater advantage by isolated electric generating plants; payment for such current to be at the annual rate of not more than six cents per kilowatt hour for the first million kilowatt hours and two and one-half cents per kilowatt hour for each or any part of each succeeding kilowatt hour; all current to be metered in the respective buildings and the proportionate cost of the total consumption to be charged against each department of the United States Government and the government of the District of Columbia, respectively, and paid monthly or quarterly, as it may be agreed, in gross, by the Secretary of the Treasury to the contractor in accordance with the provisions of the contract herein authorized and out of the appropriations made by Congress from year to year thereafter; of the amounts paid on account of the government of the District of Columbia, one-half shall be paid out of the revenues of the District of Columbia. During the fiscal year nineteen hundred and nine, payments for electric current under any contract made hereunder shall be made out of appropriations made for the purchase of electric current or for purchase, installation, operation, maintenance, or repair of electrical apparatus within the territory covered by said contract, and for the purpose of such payment said appropriations are hereby expressly made available. For the fiscal year nineteen hundred and ten, and annually thereafter, the Secretary of the Treasury shall submit estimates for specific appropriations to meet the obligations of any contract entered into hereunder. In consideration of the rates for current herein specified the contract authorized hereunder shall be for the period of ten years, conditioned, however, that the same may be terminated by the Secretary of the Treasury at any time within the period of the contract, provided that written notice of such purpose to terminate shall have been given to the contractor one year prior to the date of the proposed termination.

"From and after the execution of such contract all current actually furnished by the contractor for such buildings as may be occupied by Congress shall be at the same rates fixed by said contract, and the United States shall be entitled at any time during the period of said contract to take and receive such current as the Superintendent of the Capitol Building and Grounds may determine for the buildings occupied by Congress at the rates and under the terms of said contract."

Respectfully,

GEO. B. CORTELYOU, *Secretary.*

I want to put in this report in regard to the Willard Hotel.

Mr. GODFREY. I will state that the New Willard Hotel was on the same basis that I spoke of as to the St. James Hotel. Some two or three years ago they had occasion to shut down there in the summer, installing a new boiler or something, and they bought the current, and so they knew exactly what it cost them to buy the current.

Mr. SMITH. Is it not a fact that the only reason that places like the Portland apartment house run their electric plant in summer instead of buying the current is because of the auxiliary plants, like ice plants and refrigerator plants and their laundry?

Mr. GODFREY. The Portland, as I understand it, does not have a full house in the summer, and they do not need the full amount of light in the summer.

Mr. SMITH. That is true, but it is also true that they run a large laundry, and an ice plant, and I think, perhaps, a refrigerating plant.

Mr. SNELLINGS. Yes; but it is a small plant.

Mr. SMITH. They have to have that anyhow, and, consequently, if they buy commercial current they would still have to run their steam plant, not of course at full force, as they would in the winter time; but is it not a fact that they can buy current at $2\frac{1}{2}$ cents, and do buy it, where they do not have these auxiliaries that require the running of the plant anyhow?

Mr. GODFREY. Yes; and the company would be glad to give it to them at $2\frac{1}{2}$ cents, without giving them six million kilowatt hours either.

Mr. SNELLINGS. Of course you understand this proposed contract of ten years to bind the company and only one year to bind the Government.

Mr. SMITH. Have you any figures as to the ordinary commercial rate in cities throughout the country? Have you compiled any such figures from any source?

Mr. SNELLINGS. No; we have no figures from other cities. Of course they have many different kinds of rates. The Government is paying six and a fraction at Fort Monroe, I think.

LETTER RECEIVED FROM DR. WILLIAM A. WHITE, SUPERINTENDENT OF THE GOVERNMENT HOSPITAL FOR THE INSANE, COMMONLY KNOWN AS ST. ELIZABETH'S, ON THE SUBJECT OF CURRENT AT THE INSANE HOSPITAL.

WASHINGTON, D. C., May 3, 1908.

HON. JAMES A. TAWNEY,
*Chairman House Committee on Appropriations,
House of Representatives, Washington, D. C.*

SIR: In the sundry civil bill which has been reported to the House there is a section providing that in future all electrical current used by Government buildings in the District of Columbia will be supplied by contract. In my estimation this provision as affecting the Government Hospital for the Insane would be little less than a calamity. I desire, therefore, to call to your attention certain reasons why this institution should not be included in any such general contract scheme.

In the first place I take it that the general purpose of the section is to provide electrical current at a lesser cost than it can be provided by the various independent plants throughout the District. The provisions as set forth in the bill may perhaps do this in small plants under the conditions that maintain in many of the public buildings. It can not, however, operate to economic advantage with reference to this institution. In the first place we have a large plant, approximating 3,000 horsepower, and the steam heating and electrical generating plants are combined, so that as a matter of fact, the electrical output is only a small portion of the total production of the plant. This is so to a much larger extent than it would be in other Government buildings, for our steam plant has to run all summer to provide the various kitchens throughout the institution for cooking purposes. This use you can see requires a very considerable percentage of our steam production, when I tell you that we set approximately 10,000 meals per day in the hospital, and operate some twelve separate kitchens. These facts make it *prima facie* evident that we can produce electricity at a lower figure than a contractor with the added percentage of profit. A recent estimate, made upon the basis of all the facts that we have been able to gather, makes it very evident that our production of current costs us less than 2 cents per kilowatt hour. I may say further, that irrespective of the cost of the current, there would be no commensurate saving in deriving electrical current from an outside source, because there would be comparatively no reduction in our force of employees resulting from such change, and there would be, on the contrary, a corresponding increase in cost of the steam production.

While I believe the above-mentioned economic considerations ought to be sufficient to exclude this hospital from the operation of that portion of the section of the law referred to, still it is only a minor consideration, after all. It must be remembered that this hospital can in no wise be compared with other Government buildings, which operate in the main only during the daytime, and the populations in which are essentially clerical. This institution in many respects is a small municipality, but unlike the ordinary municipality, a large proportion of its population are insane. We have at present over 2,700 insane people in this institution. Now, next to fire, there is probably no more terrifying accident that can happen in an institution of this sort than to be plunged into darkness. Should such an accident happen in this hospital I hardly like to contemplate what the results might be. We have included in this 2,700 patients numerous persons who have threatened or attempted suicide or homicide, and among our criminal population we have approximately 25 men who have actually committed homicide. Darkness would give this class of patients the opportunity they were looking for, either to end their own lives or to make their escape, and it would deprive the working force of the hospital with the power to supervise and control them. It is true that under the operation of our plant, occasionally a fuse will blow out and put out a considerable number of lights, but in no case is it possible for more than a few wards to be left in darkness, and when this happens, the hospital is in instantaneous touch with the situation, and the damage is repaired in a few minutes. It must be considered in connection with such a situation that nine-tenths of the place is light, and that people can go and come to attend to the work that is necessary to meet this accident. Should our electrical supply come from a contractor, however, an accident might happen at the source of this supply, and plunge the entire hospital into darkness, and the hospital would have no contact with the power plant, and would be in no position to remedy the disaster within the least possible time. Should one of the electrical generators in our power plant break down, another one could be put into operation inside of five minutes, for in equipping our plant a wise foresight provided a duplication of the electrical generating machinery. This duplication could not be expected of a contractor who was supplying the enormous amount of current contemplated in the above-mentioned section of the sundry civil bill.

That my fears as regards this discontinuity of service should electricity be furnished us by a contractor are well founded, I may say that the Freedman's Hospital is now obtaining current from the contractor to whom the contract for supplying public buildings would go in the event of the passage of this bill. Inquiry regarding the service at this building discloses the fact that my fears are only too well grounded.

You may consider, in addition to the facts above stated, that this is a hospital treating all sorts of illnesses; that deaths are constantly occurring, approximately 200 per annum; that there are always people here who are seriously ill; that surgical operations are frequently performed, and often necessitated at night. You will see, therefore, how absolutely necessary it is for the proper protection of the welfare of our patients that the hospital maintain and control its own electrical generating plant.

When I appeared before your Committee on Appropriations I endeavored to set forth to you certain dangers from which the present plant suffers, and I requested an appropriation which would cure these evils. This appropriation was disallowed. In connection with the matter above mentioned I desire to recall to your mind the danger points in this plant. They are at present two. The conditions in the new tunnels were such that the insulation upon some 3,000 feet of copper cable has been completely destroyed. The result is that should a steam pipe burst in this tunnel and laden the air therein with moisture a very material portion of the hospital would be left without electrical current. Another danger is that the electrical cables which leave the power house to supply the new section of the hospital run through a wooden conduit. Five minutes of flame in this location would destroy the ability to furnish electrical current to the new section. These are two very serious dangers in connection with the plant. They are taken care of as fully as I know how to meet them, and although our plant may go on for some time to come without a breakdown, still if it does it is largely the result of good fortune.

Now, I pray you, sir, that you do not add to the gravity of the situation and embarrassment under which we are now laboring by a third source of danger, which will in no way overcome either of the other two. May I ask of you your careful consideration of these objections that I have stated, in behalf of the welfare of the hospital and the Federal charges committed to its care.

I am as always at your disposal for any information you may desire with reference to this and other matters pertaining to the institution.

Respectfully,

WM. A. WHITE, *Superintendent.*

(Transmitted through the office of the honorable Secretary of the Interior.)

GOVERNMENT PRINTING OFFICE.

**STATEMENTS OF CAPTAIN HENRY T. BRIAN, ACTING PUBLIC
PRINTER, AND MR. FRED L. POWERS, CHIEF ELECTRICIAN.**

Mr. SMITH. Who in the Public Printing Office is in charge of all matters connected with the generation of electric current for power and light?

Captain BRIAN. Mr. Fred L. Powers, the chief electrician.

Mr. SMITH. We will then call Mr. Powers, and ask you further questions, Captain Brian, as we proceed.

Captain BRIAN. Yes, sir.

Mr. SMITH. Your name [addressing Mr. Powers] is Fred L. Powers?

Mr. POWERS. Yes, sir.

Mr. SMITH. What is the exact title of your position?

Mr. POWERS. Chief electrician of the Government Printing Office.

Mr. SMITH. The Government Printing Office requires a considerable amount of power as well as of light from electric current, does it not, Mr. Powers?

Mr. POWERS. Yes, sir.

Mr. SMITH. You also have extensive buildings that are necessarily heated?

Mr. POWERS. Yes, sir.

Mr. SMITH. Have you a single plant for supplying the heat and electric current for power and light?

Mr. POWERS. No, sir.

Mr. SMITH. Is it entirely distinct?

Mr. POWERS. It is all one plant, to supply both heat and power.

Mr. SMITH. You misunderstood me. I asked you if you had a single plant.

Mr. POWERS. I supposed you asked me if we had a separate plant.

Mr. SMITH. We understand each other now. Are the boilers that are used for heat the same boilers that are used for power and light?

Mr. POWERS. Yes, sir.

Mr. SMITH. So that there is no separation, even within the plant, on that line?

Mr. POWERS. None whatever.

Mr. SMITH. How many boilers have you?

Mr. POWERS. Eight.

Mr. SMITH. How many are there in ordinary use?

Mr. POWERS. It is according to what kind of weather it is. In the winter time it takes about six and in the summer season about four.

Mr. SMITH. So that, generally speaking, you have a reserve of two boilers in the winter and four boilers in the summer?

Mr. POWERS. Yes, sir.

Mr. SMITH. What is your system of heating?

Mr. POWERS. It is low-pressure steam where it is taken right from the live mains right through the high-pressure sides of the reducing valves.

Mr. SMITH. But you do not have any hot-water feature connected with it?

Mr. POWERS. None whatever.

Mr. SMITH. Do you heat with exhaust steam?

Mr. POWERS. No; with live steam.

Mr. SMITH. Do you not use the exhaust steam at all?

Mr. POWERS. No, sir.

Mr. SMITH. How old is this plant?

Mr. POWERS. The first part of it was put in, the first four boilers went in, in 1897, if I remember aright.

Mr. SMITH. Are they in the new building?

Mr. POWERS. They are connected with the new building.

Mr. SMITH. They are not in the new building?

Mr. POWERS. No, sir. The first boiler room and engine room was built before the new building was put over there.

Mr. SMITH. Where are they with reference to the new building?

Mr. POWERS. They are in the annex. It is connected with the new building now.

Mr. SMITH. The annex was called the new building for a while, was it not?

Mr. POWERS. No; it was with the power plant. It was across from the new building.

Mr. SMITH. West of that was built the new building?

Mr. POWERS. Yes; the annex.

Mr. SMITH. And south of it was built what is called the present new building of the Government Printing Office?

Mr. POWERS. Yes, sir.

Mr. SMITH. This power plant is in the corner, so to speak, between those two buildings?

Mr. POWERS. Yes.

Mr. SMITH. The annex being a building that is long north and south, and the new building proper is long east and west?

Mr. POWERS. Yes, sir.

Mr. SMITH. Now, if you use no exhaust steam, it ought to be fairly easy to determine how much of the cost is for heat, and how much of the cost is for current, ought it not?

Mr. POWERS. It would be if we should separate them.

Mr. SMITH. But without separating them, is it not a fact that among electrical engineers 25 to 35 pounds of steam is regarded as the equivalent in energy of one kilowatt hour?

Mr. POWERS. About that; yes.

Mr. SMITH. Basing the estimate upon such a hypothesis as that, can you tell me what the electric current costs at the Government Printing Office?

Mr. POWERS. I can tell you what it costs per kilowatt hour, including all steam generated for operating and manufacturing purposes; but there are so many small house pumps and ice-plant pumps and glue-pots and other things used for manufacturing purposes that it would be hard to get exactly what amount of steam is used.

Mr. SMITH. Have you a wattmeter?

Mr. POWERS. Yes.

Mr. SMITH. If you have that, and if it takes 35 pounds of steam per kilowatt, why is it not easy to find out with the wattmeter how much steam you use for current, particularly if you know how much you use altogether and know what it costs altogether? Why can't you find with the wattmeter, allowing 25 to 35 pounds of steam per kilowatt hour, so that you can know just exactly what the current costs you?

Mr. POWERS. That depends upon how the engine is running, whether it was running economically or uneconomically. It would be only guesswork. It would not be accurate.

Mr. SMITH. Would it not be fairly accurate? Of course you could be running it economically or otherwise, but if you charged the current with 25 to 35 pounds of steam per kilowatt hour and knew what all your steam costs in coal and service and everything, why could you not tell to a nicety what the current alone would cost?

Mr. POWERS. I guess we could.

Mr. SMITH. Can you figure it that way for us?

Mr. POWERS. I certainly can, of course.

Mr. SMITH. Then I wish you would furnish to us a statement, at your earliest convenience, what the cost per hour is of steam per kilowatt hour, on the assumption that 25 pounds of steam is the equivalent in energy to a kilowatt hour, and then on the assumption that 35 pounds is the equivalent.

Mr. POWERS. I will.

Mr. SMITH. Now, then, are you able to tell, from your present knowledge and your acquaintance with the plant, which is the greater consumer of steam, the electric plant or the other uses to which steam is put in the Government Printing Office?

Mr. POWERS. That would be pretty hard to tell, for the simple reason that on a cold day we use a lot of steam for heating purposes, and on a day like this, a mild day, there is no steam on the building at all.

Mr. SMITH. When you find out how many kilowatt hours per meter you have—you have produced a current for the last year, say—you will then be able to tell accurately how much steam is used for the current?

Mr. POWERS. For manufacturing and heating purposes combined?

Mr. SMITH. No. You have agreed with me, I believe, that 25 to 35 pounds of steam is regarded as the equivalent in energy of one kilowatt hour?

Mr. POWERS. Yes, sir.

Mr. SMITH. When you look at the wattmeter for the last calendar year you can tell very accurately how much steam was used in the last calendar year for current, can you not?

Mr. POWERS. We ought to be able to do it; but I do not quite understand how you are going to get at it to figure it out that way. We run 120 pounds of steam pressure there in the boilers.

Mr. SMITH. Well, you know, as an electrical engineer, how much steam you have produced from the record there?

Mr. POWERS. From our boilers; yes.

Mr. SMITH. Now, you know just how many kilowatt hours you have produced of current, don't you?

Mr. POWERS. I certainly do; but I do not see how you can measure the steam for heating purposes when there is no meter on the steam.

Mr. SMITH. Haven't you got a steam meter?

Mr. POWERS. No, sir.

Mr. GRAFF. Suppose you know what number of pounds you have produced for the entire year, and you know what the total expense has been for the entire year, can you tell what the cost is, per pound, for the year?

Mr. POWERS. You might be going to the full capacity of a boiler, and you might have to shove in a lot of coal and water. You have

no method of telling how much steam goes out. You might have that steam boiler and keep up the 120 pounds of steam, and still have the same horsepower as before.

Mr. SMITH. Is it not entirely practicable to see how much steam is produced?

Mr. POWERS. It could be measured by a steam meter.

Mr. SMITH. What would it cost to put such a meter on this plant, so as to know how much you are producing?

Mr. POWERS. I could not tell. I have never handled one.

Mr. SMITH. Would you not think it was good administration to know how much steam you were getting from your coal in a year?

Mr. POWERS. Yes; I think it would. There has been talk of changing it over so that we would know, but we have not come to that point yet.

Mr. SMITH. You do not know what a pound of steam costs you down there?

Mr. POWERS. No, sir.

Mr. SMITH. As you do not know how many pounds you have had?

Mr. POWERS. No, sir.

Mr. GRAFF. You will have to have a few more factors, Brother Smith, before you can figure that example. [Laughter.]

Mr. POWERS. I do not see how we can measure the steam down there with the apparatus at the present time. We have no means of telling how much steam we make.

Mr. SMITH. Or how much it costs you?

Mr. POWERS. We do not know how much it costs for current, but in the gross we know what the entire cost is.

Mr. SMITH. How many men have you got employed in and about the production of electric current that would be required at that institution if the Government was buying current from a commercial source?

Mr. POWERS. I could not tell exactly, because the engineering department is under the chief engineer, and I am not positive as to the number of men he has.

Mr. SMITH. Are you familiar with what, under fairly good administration, is the cost per pound for steam in such a plant as you have?

Mr. POWERS. No, sir.

Mr. SMITH. What does this particular one cost per pound? Is not that a matter that is covered by tables, as to how much steam will be produced per pound with a given grade of coal?

Mr. POWERS. Yes; I think it is.

Mr. SMITH. You ought to be able to compute with reasonable accuracy, from the amount of coal you burn and the quality of the coal, the amount of steam you produce per year.

Mr. POWERS. Possibly the chief engineer could obtain that information.

Mr. SMITH. Will you obtain from the chief engineer, if possible, his estimate of the gross number of pounds of steam you produced there in the last calendar year?

Mr. POWERS. I will ask him the question. I think he will be able to answer it.

Mr. SMITH. Estimating it on the number of pounds of coal consumed and the quality of the coal?

Mr. POWERS. Yes, sir.

Mr. SMITH. That, even without a meter, is susceptible of fairly accurate estimate, is it not, as you understand it?

Mr. POWERS. I believe it would be.

Mr. SMITH. If you would get from him this statement of the gross cost of the production of steam, not only in labor, but in coal and everything else, and then his gross estimate of the number of pounds of steam that should have been produced from that number of pounds of coal, it would be practicable for you to tell pretty accurately upon that hypothesis what the current cost you per kilowatt hour, would it not?

Mr. POWERS. I believe it would, if we can find out the number of pounds we produced.

Mr. SMITH. You think you can find out how many pounds you ought to have produced with the coal, can you not?

Mr. POWERS. Yes, sir.

Mr. SMITH. So that that will fill in approximately the data we would like by reason of not having a steam meter?

Mr. POWERS. Yes.

Mr. SMITH. Will you attempt during the day, if possible, to get that for us and furnish it to us?

Mr. POWERS. I will.

Mr. SMITH. How many men have you employed under you in that building, Mr. Powers?

Mr. POWERS. I think I have 76; that is, including all elevator conductors, laborers, electricians, and helpers.

Mr. SMITH. Now, omitting elevator conductors, and omitting all except as many of the men as in your best judgment would be absolutely requisite to keep a local electrical apparatus in shape, if you were using commercial current how many men, in your judgment, in an economical administration could we separate from the service if we were using a commercial current?

Mr. POWERS. I think we could not drop any.

Mr. SMITH. Under what theory do you reach that conclusion, Mr. Powers?

Mr. POWERS. There are only three men in the dynamo room that attend to what we call producing electric current. Those men would be required there to take care of any rotary converters that are put in, and switchboards, and to take readings from the different sections of the building; and those men would be required to be on duty eight hours apiece, and I do not see how we can do away with any men by using current from the outside in the electric section.

Mr. SMITH. Could you get along with a cheaper grade of men if you were using commercial current?

Mr. POWERS. No, sir.

Mr. SMITH. Does it require as good a man to take readings as to repair a dynamo?

Mr. POWERS. If anything went wrong it would require a man to put it in shape.

Mr. SMITH. For the least of this machinery that you have, for the least number of men it would take to operate it and care for it, would it take just as many men?

Mr. POWERS. In the electrical section?

Mr. SMITH. Yes.

Mr. POWERS. Yes, sir; but not in the engineering department.

Mr. SMITH. Is it not true that the more electrical machinery you have the more repairs you necessarily will have, and if you have eliminated the engines and the dynamos both, would not that reduce the amount of work to do in connection with the electrical branch?

Mr. POWERS. If they change to an outside current in the building, they would have to change the converters.

Mr. SMITH. You would not use as many as you do now?

Mr. POWERS. That would not make any difference. We have one on each shift now.

Mr. SMITH. How many dynamos have you?

Mr. POWERS. Four.

Mr. SMITH. Can you tell now what your production the last calendar year was per kilowatt hour?

Mr. POWERS. Practically 350,000 per month.

Mr. SMITH. Three hundred and fifty thousand kilowatt hours per month?

Mr. POWERS. Yes.

Mr. SMITH. If you should put in a commercial current, would the alternating current of commerce have to be converted into a continuous current?

Mr. POWERS. Yes, sir.

Mr. SMITH. Do you think that would require these men to watch these converters from the alternating current to the continuous current?

Mr. POWERS. Yes, sir.

Mr. SMITH. How many converters would be required?

Mr. POWERS. It would vary according to the amount of current used.

Mr. SMITH. If you would make them large enough, a single one would be sufficient, would it not?

Mr. POWERS. Yes; but I would recommend putting in more than one, because we have a heavy load during the daytime and a light load at night. Large machines do not run well on a light load.

Mr. SMITH. It would be a good investment to have a larger machine for the daytime and a smaller one for night?

Mr. POWERS. Yes, sir.

Mr. SMITH. Have you any estimate at all of what the electric current costs you per kilowatt hour now, without reference to these matters that I referred to?

Mr. POWERS. We keep a record of the cost, but it includes all heating and manufacturing purposes of steam.

Mr. SMITH. What is the total cost for heating, manufacturing, and all other purposes of steam there for the last calendar year?

Mr. POWERS. I could not tell you for the last calendar year. I have only in my mind a recollection of the facts for the last month or two.

Mr. SMITH. A month would hardly be a fair index, would it, in view of the change and variation of the seasons?

Mr. POWERS. Hardly.

Mr. SMITH. So that it would be better to take a calendar year.

Mr. POWERS. The month of April would come close to the average.

Mr. SMITH. You can correct these notes, Mr. Powers, and I wish at this point you would fill in what the total cost of heating, lighting,

and power was during the past calendar year. I prefer that because the fiscal year dates back a little further.

Mr. FITZGERALD. What do you allow for depreciation?

Mr. POWERS. I do not remember now just what the figures were.

Mr. SMITH. As a matter of fact, you do not keep many books in the institution on this plant? That is, you have not attempted to tell what the current was costing you at any time?

Mr. POWERS. Yes, sir; but I could not separate it from the manufacturing of steam.

Mr. SMITH. I do not mean to say you can not tell what you spent for heat and light and power, but you have not made an attempt to tell what the current alone was costing?

Mr. POWERS. No. The electric part is all I have got.

Mr. SMITH. What have you to show?

Mr. POWERS. I have not any record with me. I have not anything but the reports of last year.

Mr. SMITH. You may have made, from time to time, estimates of what the electric current cost you, distinguished from heat?

Mr. POWERS. The reports were kept until Mr. Stillings came in, and then he thought we had too many clerks, and he fired them out; and since then we have kept only the output records.

Mr. SMITH. Have you kept records to distinguish the heat from the current?

Mr. POWERS. No.

Mr. SMITH. The way I have indicated would be an accurate way, would it not?

Mr. POWERS. I should judge it would be.

Mr. SMITH. What kind of coal do you use, bituminous or anthracite?

Mr. POWERS. Anthracite.

Mr. SMITH. Why do you use anthracite when the Interior Department is able, without violating the antismoke law, to use bituminous coal in the thickly settled part of the city?

Mr. POWERS. On account of the smoke. I would not be able to state exactly for what particular reasons, but the engineer has not been able to do it.

Mr. SMITH. It was stated here that the smoke was so great at the Interior Department building that they burned anthracite coal until they got more grate surface, and bituminous coal now enables them with that additional grate surface to run more cheaply.

Mr. POWERS. A different style of boilers would have to be put in in our plant to get more grate surface to the boilers.

Mr. SMITH. Would you not be able with more boilers of the same type, so as not to force them too much, to get the same number of pounds of steam by burning bituminous coal without violating the smoke law?

Mr. POWERS. Possibly that could be done.

Mr. SMITH. Is it not in this locality a very great economy to burn bituminous coal for steam if it can be done without violating the smoke law?

Mr. POWERS. Yes, sir.

Mr. SMITH. Do you know whether any effort has been made down there to so reinstall this plant as to burn bituminous coal?

Mr. POWERS. None that I know of.

Mr. SMITH. Could you give me any idea as to what is the increased cost of operating this plant by reason of burning anthracite coal instead of bituminous coal?

Mr. POWERS. About half a cent per kilowatt hour.

Mr. SMITH. Half a cent per kilowatt hour?

Mr. POWERS. Yes, sir.

Mr. SMITH. And a relatively equal cost in the production of steam for heating purposes?

Mr. POWERS. That is included.

Mr. SMITH. Do you reduce the whole steam and everything else to the equivalent of kilowatt hours? Is that what you mean?

Mr. POWERS. Yes, sir.

Mr. SMITH. Of course your record of the number of kilowatt hours will not show anything like this amount of consumption of coal?

Mr. POWERS. No. The amount of consumption of coal is kept separate, of course.

Mr. SMITH. You say it will increase the cost half a cent per kilowatt hour for current?

Mr. POWERS. Yes.

Mr. SMITH. But you are also increasing the expense for all the steam you produce for heat?

Mr. POWERS. That is true, but that is figured in the total output for steam purposes and electrical.

Mr. SMITH. That is, you reduce all the steam you produce to kilowatt hours?

Mr. POWERS. Yes, sir.

Mr. SMITH. So that if you will fill in your statement here the production of kilowatt hours, you will mean that that will record the production for heating purposes?

Mr. POWERS. Yes, sir.

Mr. SMITH. You say you have a watt meter down there. That does not record the steam produced for heating purposes?

Mr. POWERS. No; but the labor and coal is figured in every kilowatt hour for the whole building.

Mr. SMITH. Do I understand that the whole expense of coal is charged to the current?

Mr. POWERS. It is all figured up that way.

Mr. SMITH. That is not very accurate, is it?

Mr. POWERS. I will admit that.

Mr. SMITH. What kind of elevators have you got in those buildings?

Mr. POWERS. Electric.

Mr. SMITH. Are they all electric?

Mr. POWERS. Yes.

Mr. SMITH. How many of them are there?

Mr. POWERS. I will have to count them up. Twenty-two, including the form lifts.

Mr. SMITH. You have no machinery or other equipment that is moved by hydraulic power?

Mr. POWERS. No, sir.

Mr. SMITH. Every form of power used, then, in all the Public Printing Office is electric, is it?

Mr. POWERS. Except the steam pumps.

Mr. SMITH. And they are operated by steam directly, as well as used for pumping steam; is that it?

Mr. POWERS. One is used for a fire pump, one for a house pump and ice plant—a water-cooling system. We do not manufacture ice.

Mr. SMITH. You have a refrigerating system, as distinguished from an ice plant?

Mr. POWERS. Yes.

Mr. SMITH. What is that for? For drinking water?

Mr. POWERS. Yes.

Mr. SMITH. You have no mechanical uses for outlet water there?

Mr. POWERS. No, sir.

Mr. SMITH. Is it not regarded as an extravagant system to throw away your exhaust steam in place of using it for heating purposes?

Mr. POWERS. No, sir; I do not think so.

Mr. SMITH. You are of opinion that there is no economy in the use of exhaust steam for heating purposes?

Mr. POWERS. This is getting into the engineering part of it, and I am not a steam engineer, you know. These statements I am making in regard to the steam end of it may not be correct.

Mr. SMITH. Let us see. You are an electrical engineer?

Mr. POWERS. Yes, sir.

Mr. SMITH. Ought not an electrical engineer to know whether a combined system of utilizing steam for one or the other plant is more economical than a single system?

Mr. POWERS. That is the engineering end of it.

Mr. SMITH. Ought not an electrical engineer to know the most economical method of using electrical devices?

Mr. POWERS. I should not know.

Mr. SMITH. I should think that one of the things that an electrical engineer would know is to know the cheapest method of maintenance of electrical apparatus. Is not that a part of electrical apparatus, or a part of the knowledge of electrical apparatus, to know how to operate it in the most economical and effective way, not to throw away the exhaust steam, but to operate it and save the exhaust steam?

Mr. POWERS. I guess so.

Mr. GRAFF. Do I understand you to say that the building is heated with steam?

Mr. POWERS. Yes, sir.

Mr. GRAFF. And that you charge the entire cost of the coal to electric current?

Mr. POWERS. Yes, sir; it is figured that way. It is figured up as the total cost per kilowatt hour, including the steam heat for the building and all manufacturing purposes.

Mr. GRAFF. What proportion of the total ought to be charged to the steam heat?

Mr. POWERS. Oh, it would be different at different times in the year. It would be pretty hard to tell.

Mr. GRAFF. In the winter season, when you are using it most, for example?

Mr. POWERS. I should judge an average of 50 per cent.

Mr. FITZGERALD. That is a mere guess, is it not?

Mr. POWERS. Yes.

Mr. FITZGERALD. That does not amount to anything.

Mr. SMITH. Captain Brian, I wish you would fill in with your testimony, if you will, an estimate from your mechanical engineer as to what would be the cost, based upon standard forms of estimating such things, of heating this building and of operating the pumps and doing all things that are done by steam, as distinguished from those done by electric current.

Captain BRIAN. Yes, sir.

Mr. SMITH. When you get these notes, gentlemen, you can fill in the information suggested. That is all we will ask of you this morning.

Captain BRIAN. All right, sir.

WASHINGTON, D. C., May 14, 1908.

SIR: We have no correct data concerning cost of maintaining power plant for the last calendar year, due to the reorganization of the office and changes in method of accounting instituted by the audit system.

If we had not generated our own electric power during the month of April, 1908, our cost for heating of buildings and manufacturing would have been \$3,303.61, as against \$6,380.52, including electric power and steam for all purposes.

Respectfully, yours,

R. J. ALLEN, *Chief Engineer.*

Capt. HENRY T. BRIAN,

Acting Public Printer, Government Printing Office, Washington, D. C.

BUREAU OF YARDS AND DOCKS, NAVY DEPARTMENT.

STATEMENT OF MR. NEVIL MONROE HOPKINS, ELECTRICAL ENGINEER.

Mr. SMITH. What official position do you hold, Doctor Hopkins?

Mr. HOPKINS. Electrical engineer, Bureau of Yards and Docks, Navy Department.

Mr. SMITH. Doctor, are you able to tell us what is the ordinary cost of electric current produced by the Navy Department at the various navy-yards in the United States per kilowatt hour?

Mr. HOPKINS. I think so. Perhaps we ought to qualify a little bit, because we are just bringing about a consolidation of plants. We have had a number of small plants heretofore, and—

Mr. SMITH. That is to say, recently at the navy-yards each bureau of the Navy had its own electric plant?

Mr. HOPKINS. Yes. Each bureau—the Bureau of Construction and Repair, Steam Engineering, Yards and Docks, Equipment, and so on—had its own plant and its own employees. The plants were all comparatively of small capacity and comparatively inefficient. Your question is rather a sweeping one, because if you want me to give you an idea of the average, I would have to take some of the old plants and one or two of the modern plants, and that would give a figure that would not be, perhaps, of much value.

Mr. SMITH. We want the information you can give us largely in your own way, but suppose you give us, outside of Washington, what new plants you have.

Mr. HOPKINS. The Washington plant is perhaps the only one in complete operation, the only consolidated modern plant in complete operation. We have others; we have other plants. We have one at League Island, but it is not in complete swing yet. We have one at Portsmouth, N. H.

Mr. SMITH. What is the most complete?

Mr. HOPKINS. Perhaps the most complete would be the plant of the Steam Engineering Bureau in New York. It is not a modern, consolidated plant, but it is a good plant. It is producing electricity now, taking everything into consideration, for something under 1 cent per kilowatt hour.

Mr. SMITH. In that connection, what do you charge for depreciation?

Mr. HOPKINS. I think in that case—I am not sure; I did not put that plant in—but I think the life of the machinery was fixed at about ten years.

Mr. SMITH. So that, in making this estimate of less than 1 cent, you have calculated approximately 10 per cent for depreciation per annum for the plant?

Mr. HOPKINS. I think that includes about 10 per cent; just about.

Mr. SMITH. Now, what is the next most complete and fair testing place after the New York yards?

Mr. HOPKINS. I am picking out now the largest units. The larger the plant and the larger the units, the more economical the performance.

Mr. SMITH. Is that statement unlimited, now, Doctor?

Mr. HOPKINS. I do not quite understand the question.

Mr. SMITH. I will make it more plain. After you get up to a large unit is there still a continuous reduction every time you increase it?

Mr. HOPKINS. You mean, if we increase the units to a still larger capacity would it be producing electricity at a still cheaper rate?

Mr. SMITH. Suppose you had a plant that produced 500,000 kilowatt hours per month; that would be a large plant?

Mr. HOPKINS. Yes.

Mr. SMITH. Suppose you increased that to 600,000 kilowatt hours per month; would that still further reduce the cost, in your judgment?

Mr. HOPKINS. That would depend upon whether you were increasing the size of the units or increasing the number of units of the same size. If you discard some of the small units and put large units in place of them, you would reduce the cost.

Mr. SMITH. Do you think there is absolutely no limit to that process?

Mr. HOPKINS. The only limit I can see is as to the materials on hand.

Mr. SMITH. Would you not get the current for nothing if it was absolutely continuing to the end? Don't you reach a point eventually where the reduction in the rate of cost stops?

Mr. HOPKINS. We could not make a shaft beyond a certain size, and the same is true with materials.

Mr. SMITH. Have you not got it up to so high a state, as to size, that further increase would not further reduce the cost—that is, that the economies are lost in the enlargement?

Mr. HOPKINS. There are so many limiting things. Our tunnels would prohibit the shipment of larger castings for larger generators. We could not get them through on the railroads.

Mr. FITZGERALD. Conceding that you could get the materials to enable you to increase the size of the units to any desirable size, is it true that the larger they are made, the smaller the cost of production?

Mr. HOPKINS. There would be a curve, according to my mind. I never looked at it in that way, but there would be a curve, increasing in economy up to a certain point, and getting less and less until

finally you would reach a point where you would get no further economy.

Mr. SMITH. That was my surmise, that you could get a size where you would reach the maximum of economy. You do not think you have reached that point?

Mr. HOPKINS. My offhand opinion is that we have not; yes, sir.

Mr. SMITH. Now, you may proceed, in your own way, to give us information of any other plants you have in mind.

Mr. HOPKINS. I am familiar with a great many plants in this country of all sizes, using steam in high degrees of superheat, where high degrees of vacuum are sought and attained, where the attendance is well systematized, and where the units are large, and I should say there are plants where they can produce a kilowatt hour for three-quarters of a cent.

Mr. SMITH. Including depreciation?

Mr. HOPKINS. I think including depreciation.

Mr. SMITH. Have you anything to show what is the highest price you are paying for current now, purchased by yourselves?

Mr. HOPKINS. I think so.

Mr. SMITH. What is the highest price?

Mr. HOPKINS. Probably the little plant at Pensacola, Fla., where we have two very small, on the spit, simple engines, noncondensing, working on saturated steam, low boiler pressure, low tension distribution, and everything against them. There we are paying, as near as I can recall, about 4 cents.

Mr. SMITH. You think that is the highest price in the Navy?

Mr. HOPKINS. I should say 5 cents would cover the cost of everything in any navy-yard to-day in producing electric power, with everything against us, with small, inefficient units.

Mr. SMITH. What would you say was the average, Doctor, in the United States, in the navy-yards?

Mr. HOPKINS. I think it would not be quite fair to say "average" to-day; it would alter so much to-morrow when our plants are finished. I am speaking figuratively now—

Mr. FITZGERALD. This is a recent matter?

Mr. HOPKINS. Yes; within four or five years.

Mr. SMITH. It was an act of Congress requiring this consolidation?

Mr. HOPKINS. Yes, sir.

Mr. FITZGERALD. It has not gone on very rapidly?

Mr. HOPKINS. It has gone on very slowly.

Mr. FITZGERALD. So that it may be fair to take the average price to-day, because, although you have gone very slow, you have still reduced the average price very much during the past two or three years?

Mr. HOPKINS. Yes. I think I can give you a fair idea. The average to-day—I could do better if I had all my data in my office to make the calculations—but I should say it would be in the neighborhood of 2 cents.

Mr. SMITH. Including depreciation and everything?

Mr. HOPKINS. Yes.

STATE, WAR, AND NAVY BUILDING.

STATEMENT OF CAPT. JOHN HUDSON POOLE, U. S. ARMY,
SUPERINTENDENT.

Mr. SMITH. Captain Poole, what official position do you hold under the United States Government?

Captain POOLE. I am a captain in the Corps of Engineers, United States Army, and am detailed as superintendent of the State, War, and Navy building.

Mr. SMITH. Does the superintendent of the State, War, and Navy Departments building also have charge of the Winder Building?

Captain POOLE. No, sir.

Mr. SMITH. Does he have charge of any of the annex buildings of any of the Departments?

Captain POOLE. Yes.

Mr. SMITH. What?

Captain POOLE. Of the State Department annex.

Mr. SMITH. Where is that?

Captain POOLE. On the corner of Seventeenth street and New York avenue, a building which has been rented by the State Department within the last year; also the Navy Department annex, or Mills Building.

Mr. SMITH. When you say "the Mills Building" you do not include, then, that portion of the Mills Building occupied by the War Department in connection with the Isthmian Canal Commission?

Captain POOLE. No, sir; I do not include that.

Mr. SMITH. Is there anything else that you have charge of?

Captain POOLE. No, sir. That is all, except that electric power from the plant in the State, War and Navy Departments building is furnished to the White House, the War Department printing office, the War Department stables, and——

Mr. SMITH. Where is the War Department printing office?

Captain POOLE. It is between Seventeenth and Eighteenth streets and between F street and New York avenue, right in that same block.

Mr. SMITH. Where is the War Department stable?

Captain POOLE. In the same locality.

Mr. SMITH. Any other buildings?

Captain POOLE. The White House, that I have mentioned.

Mr. SMITH. Do you light the White House stables?

Captain POOLE. No, sir. That comes from the city.

Mr. SMITH. And the lighting of the White House grounds comes from the commercial company?

Captain POOLE. Yes, sir; I believe that is under contract with an illuminating company in Baltimore, if I am not mistaken. I neglected also to mention the depot quartermaster's building, sometimes known as Grant's old headquarters, at the corner of Seventeenth and F streets.

Mr. SMITH. How long have you been superintendent of the State, War, and Navy building and in charge of the lighting of these other buildings?

Captain POOLE. Two years and five months.

Mr. SMITH. There has recently been installed a new heating and lighting plant in the State, War, and Navy building, has there not?

Captain POOLE. Yes, sir.

Mr. SMITH. Was that before or after you took charge?

Captain POOLE. After.

Mr. SMITH. At the time that you took charge you had 24 boilers in that building?

Captain POOLE. Yes, sir; counting both the heating and steaming boilers.

Mr. SMITH. Twelve for each?

Captain POOLE. Twelve for each.

Mr. SMITH. How many boilers have you now?

Captain POOLE. I have four.

Mr. SMITH. Are those separated, part for each purpose, or are they jointly used for heating and lighting?

Captain POOLE. They are jointly used for heating and lighting.

Mr. SMITH. When was this new plant installed?

Captain POOLE. During the past summer and fall.

Mr. SMITH. At what cost for installation?

Captain POOLE. One hundred and nine thousand dollars, including everything.

Mr. SMITH. What is your method, Captain, of separating the cost of heating and lighting for bookkeeping purposes?

Captain POOLE. I will have to answer that question by saying that there is no method in operation at the present time.

Mr. SMITH. To what extent, then, can you tell what is the actual cost of lighting per kilowatt hour in this plant in the State, War, and Navy building?

Captain POOLE. In arriving at the figures which were submitted by me to the Secretary of the Treasury when this question was propounded by him, I took the steam consumption of the electrical generating apparatus as determined by the test of runs which were witnessed by me at Lynn. I took a fair average of the steam consumption per kilowatt hour. I took a hard day load and the night load. Of course at night, when the load is light, the steam consumption per kilowatt hour is higher, as you understand. I took a fair average of 35 pounds of steam per kilowatt hour.

Mr. SMITH. Before you proceed to the result of that basis, I would like to inquire whether that basis is a reliable one; whether there is no standard table by which in these combined plants you can tell how much ought to be charged to the production of the current?

Captain POOLE. I think it is as reliable a method as we could have employed at the time.

Mr. SMITH. Is it your method, or is it a recognized standard method?

Captain POOLE. That is a recognized standard method. I would like to say in qualification of that that it is not as good a method as having some way of separating the use of steam for electric purposes and for heating purposes, and keeping actual count of the coal pile. Of course that is one of the best methods—to keep track of how much your coal actually costs you.

Mr. SMITH. This is a recognized standard method?

Captain POOLE. Yes.

Mr. SMITH. And it is upon the recognized standard basis of that method?

Captain POOLE. Yes. Of course the figure that is assigned, of 35 pounds per kilowatt hour, is an arbitrary one; but I selected it myself with the idea of taking as fair figures as I could. The show figure for the turbine is away under that, in the neighborhood of 25 pounds per kilowatt hour. I took 35 to allow for times when the vacuum was not good, when the load factor was down, and I think it is a very fair figure.

Mr. SMITH. I believe I will ask you to state a little more fully what is meant by the vacuum system, Captain.

Captain POOLE. I do not believe I understand your question. You mean the vacuum system of heating?

Mr. SMITH. Yes; that is the system you have, is it not?

Captain POOLE. No, sir; I have not what is technically known as the vacuum system. Do you mean the system I employ?

Mr. SMITH. What is the system you employ properly called?

Captain POOLE. It is a hot-water heating system by forced circulation. That is the only name I have ever seen applied to it.

Mr. SMITH. And is this force given in part by an evacuation?

Captain POOLE. No, sir; the force is applied by an electrically driven eccentric pump. The water after leaving the pump passes through the tubes of a surface condenser. The exhaust of the steam engine is turned into the side of this surface condenser. They condense the steam and take up the heat, which is transmitted through the building, and the condensed water falls to the bottom and goes back into the boiler again.

Mr. SMITH. You heat nothing except the one building?

Captain POOLE. Yes.

Mr. SMITH. And you heat it not by steam, but by hot water?

Captain POOLE. Yes.

Mr. SMITH. It was heated by hot water for many years, was it not?

Captain POOLE. Yes; ever since the system was installed. The same piping is used by me, but instead of imparting heat to that water by burning coal from a separate lot of boilers I impart the heat to it by exhaust steam impinging on tubes through which the hot water is passing.

Mr. SMITH. What has been the reduction in the expense of heat and light in the State, War, and Navy building since the introduction of this system? Do you know?

Captain POOLE. Including the reduction of force and salaries and taking into consideration the reduction and estimated reduction in waste and oil, and articles of that sort, I am figuring it at \$35,000 a year.

Mr. SMITH. Have you automatic stokers now?

Captain POOLE. No, sir.

Mr. SMITH. I knew that, but I wanted it to appear in the record. It is not possible in the quarters you have to install automatic stokers profitably, is it?

Captain POOLE. I do not deem it so.

Mr. SMITH. That is due to the fact that the coal has to be unloaded by hand in the place it is deposited?

Captain POOLE. That is one reason. The coal would have to be brought to the fire by hand, and placed in the stokers by hand, and it would require as many men to do that as to actually fire the boilers.

The stokers would have cost me in the neighborhood of \$3,000. I specified them in the bids I first called for, and then cut them out.

Mr. SMITH. Now, taking this basis of estimate, how much do you estimate the electric current costs you per kilowatt hour during the seven months that you heat the building?

Captain POOLE. 1.47 cents.

Mr. SMITH. How much do you estimate it costs you when you produce it yourself during the remaining five months?

Captain POOLE. 1.8 cents.

Mr. SMITH. Why, then, did you make a contract for commercial current for 2½ cents if you can produce it for 1.8 cents?

Captain POOLE. Because I figured it, on account of other considerations than the actual amount spent for current, that it would be an actual advantage to do so. During those months the plant will be shut down and can be thoroughly repaired. The force of engineers and firemen, which under present conditions are cut down to the very lowest point possible, can be given their annual leave, to which they are entitled by law, and it enables me through the seven months when their services are required at all times to have them for duty. Those two considerations made it seem desirable to me to give this system a try for one summer. I have made no agreement beyond the present summer. I will also say that for the present summer I have only made it for three months instead of five months. Not until the beginning of the new fiscal year will I start in on it.

Mr. SMITH. Ought a new plant to require any considerable overhauling the first summer?

Captain POOLE. I think during the first summer there will be more needed repairs than in the second or third, or up until the time the plant begins to actually depreciate. The steam joints and the steam lines will have to be gone over. A number of valves will have to be repacked, valves which in putting in the system may not have been properly adjusted. I had to make the entire change during the three months when the heat was off the building, and just got through in time.

Mr. SMITH. Now, when you estimate this current in the winter months at 1.47, do you add in the cost of all the men employed and paid leave, and everything, during the summer months?

Captain POOLE. In estimating that figure I charged against the electric current the yearly salary of one assistant engineer, the yearly salary of three dynamo tenders, the yearly coal consumption as estimated by me for current, a yearly depreciation of 10 per cent, and a yearly consumption of oil and waste. I then divided that total by the yearly output of the plant, so that it is a yearly average and not dependent on any one season at all.

Mr. SMITH. If these men are paid for five months and three months that the plant does not run, then all of their time, including their leave, ought to be charged to the actual cost of the production of the current during the winter. Is that done?

Captain POOLE. Yes; the only difference in the two figures was obtained by deducting from the current cost, as a charge for the winter months, what amount of that was chargeable to heating. I figured the heat units that had been actually supplied in that way, and charged that much against heat and deducted it from the charge against the current.

Mr. SMITH. I do not believe I understand you yet, Captain. The reduction is very slight?

Captain POOLE. Yes.

Mr. SMITH. Now, if you run only seven months, and charge twelve months' employment of all your employees to seven months, would not that raise it above 1.47?

Captain POOLE. No, sir; I do not think it would.

Mr. SMITH. Do you understand that that is what you have done in fact—in dividing up the seven months now, that you have put into the seven months the twelve months' pay for everybody?

Captain POOLE. No, sir; I have not done that. I do not think it is right that you should.

Mr. SMITH. Why not?

Captain POOLE. Because the fact that you purchase power does not relieve the Government from paying these men in the summer months.

Mr. SMITH. But you purchased power on the theory that, taking all things into consideration, you thought it was just as cheap. But these men are paid the entire year's pay for seven months' production of current—

Captain POOLE. And for other purposes and other functions that they perform—that is, I would have to have just as many firemen in the fireroom, and—

Mr. SMITH. These dynamo tenders and electrical engineers, which you count, get paid for the year. The plant runs seven months, you will say. You say that for five months they are taking their leave—

Captain POOLE. Each man would be off one month, and the other four months he would be at work in the building as a machinist.

Mr. SMITH. On this electrical machinery?

Captain POOLE. Yes.

Mr. SMITH. It is clear that the whole salary would be charged to seven months' production. You would discharge them if you did not need them, would you not?

Captain POOLE. You might in a commercial plant. Here every hour of the time is used.

Mr. SMITH. You would hardly want to say, Captain, would you, that it would take just as much time to overhaul the electric wiring and lighting system where you were fed entirely by electric current as it would take to run the electric plant yourself? Would it take that many men?

Captain POOLE. I said that their time would be fully occupied in other necessary work in the building. Their time would be put to good advantage. During the winter a dynamo tender is in the dynamo room all the time, night and day. A man needs to be there.

Mr. SMITH. Manifestly you do not need as big a force simply to look after the wiring and the lights as you need both to do that and to look after the dynamos?

Captain POOLE. No, sir; but I do not consider it practicable under civil-service rules, and so forth, to have a dynamo tender for seven months and discharge him for five months and take him on again.

Mr. SMITH. If you made a contract, you would discharge him?

Captain POOLE. Yes.

Mr. SMITH. If we made a contract we would pay him for twelve months?

Captain POOLE. Yes.

Mr. SMITH. But he works seven months as a dynamo tender and four months in looking after repairs of dynamos and other work of that kind around the building?

Captain POOLE. Yes, sir.

Mr. SMITH. Don't you think upon that statement that you have undercharged this winter current if you have let the contract for the summer?

Captain POOLE. You think I have undercharged what?

Mr. SMITH. The winter current. In other words, you told me, if I understood you correctly, that these dynamo tenders repaired these dynamos during these four months.

Captain POOLE. Yes.

Mr. SMITH. And kept them up to a high standard of efficiency.

Captain POOLE. Not only that, but I could put them to work on the heating system. I have a lot of new joints on the heating system, and I was contemplating putting them to work there. The repairs are not possible during the winter when the heat is on. During the summer they are.

Mr. SMITH. Your leave ought to be charged on. What are we getting for this leave?

Captain POOLE. I do not believe I understand you, sir. What are we getting?

Mr. SMITH. Yes; we pay those men for twelve months. We only get eleven months' work at the most, if you let a five months' contract in the summer, or whether you do or not. Now, when you come to compute what this current costs in winter, you ought at the very least calculation to charge seven-elevenths of the leave time, ought you not? That is the very minimum.

Captain POOLE. You mean to take seven-elevenths of the fireman's pay and add it to his seven months' pay?

Mr. SMITH. I am charging it to what it costs to get that current.

Captain POOLE. Well, sir, I think you are getting it down pretty fine. In figuring on these figures I merely charged against the electric current what expenditures I would be relieved of if we ceased to produce the current.

Mr. SMITH. You would not require a chief electrician and dynamo men all the year round?

Captain POOLE. I do not see any practical way of having them seven months of the year and not five months more.

Mr. SMITH. I do not claim it is the time that ought to be charged to the production of seven months. I want you to tell me if that is not the way you keep books?

Captain POOLE. I do not think I can contradict the statement at all.

Mr. SMITH. It is not a question of contradiction. It is a question of analyzing this system of bookkeeping. If you pay those men for twelve months in and about this electric plant, you should not only charge the winter current with the seven months' pay, but the very least you could do would be to charge it with seven-elevenths of another month for their leave, and then you ought to charge it with any time they spent on repairs during the summer. That is chargeable to the winter current, too, is it not?

Captain POOLE. Yes; it is.

Mr. SMITH. And it is not in your figures?

Captain POOLE. No, sir; it is not. If I had divided the total I arrived at by summing up the expenditures by the production of the plant during seven months, then that would have appeared in the figures to a greater extent.

Mr. SMITH. Don't you think that is a fair way to fix it?

Captain POOLE. Yes; I do think it would be closer. It is all an approximation.

Mr. SMITH. It is all an approximation, but if you eliminate five-twelfths of the cost of labor you have eliminated quite a little item?

Captain POOLE. Yes, sir. That is quite a little item.

I would also say that in making this estimate, in arriving at this estimated figure, as in all other estimates, I have estimated to allow for little discrepancies of the kind you bring up, by estimating wide on the cardinal points, as I considered them.

Mr. SMITH. Now, when you charged the winter current with this 35 pounds of steam per kilowatt hour, are you able to say you are charging it with coal and firemen at exactly the same rate per pound for steam as the total steam costs you?

Captain POOLE. In the first place, I will say that I have not charged any firemen against the production of electric current, because the force of firemen I have would be necessary otherwise.

Mr. SMITH. Would there be just as many firemen necessary? Are you able to say now that three boilers would not furnish the heat if you turned the steam direct from the boiler against these water pipes?

Captain POOLE. I only fire up two of those four boilers.

Mr. SMITH. You have a full duplex system, then?

Captain POOLE. Yes, sir.

Mr. SMITH. How many firemen do you have for the two boilers?

Captain POOLE. I have two on a shift, and run three shifts.

Mr. SMITH. Is it necessary to have two on the night shift?

Captain POOLE. It is, during the winter months.

Mr. SMITH. When the fires are very low will not one boiler heat it?

Captain POOLE. No, sir. During the winter months, when we are heating that building, we use almost as much coal during the night watch as we use during the day watches, because the temperature of the water has to be kept up.

Mr. SMITH. So that in computing the value of these 35 pounds of steam, you have computed nothing except the coal necessary to produce it? Is that right?

Captain POOLE. I have charged a depreciation on the plant.

Mr. SMITH. I assumed that was a separate item.

Captain POOLE. You mean confining the work to the boiler room?

Mr. SMITH. Yes. You have charged nothing for the 35 pounds of steam per kilowatt hour except the coal necessary to produce that steam?

Captain POOLE. Yes; that is all.

Mr. SMITH. Now, in computing the 10 per cent depreciation, what have you computed that on—the boilers and everything, or simply on the engines and dynamos?

Captain POOLE. I have computed that merely on the electrical generating apparatus. I have taken the 10 per cent on \$15,000, which is the approximate value of the generating apparatus.

Mr. SMITH. What do you include in the generating apparatus—simply the dynamos, or the dynamos and engines?

Captain POOLE. The dynamos and engines, the generating sets.

Mr. SMITH. How many generating sets have you?

Captain POOLE. I have three.

Mr. SMITH. And they only cost \$5,000 apiece?

Captain POOLE. They cost differently. One set cost \$7,000, but that is including the switch board and wiring. Another set cost \$4,000, and the fourth set is an old set, which was a remnant of the old plant, which I had overhauled at a cost of \$200 or \$300 and put in place.

Mr. SMITH. You mean the third set and not the fourth set?

Captain POOLE. Yes; the third set. I valued them altogether at \$15,000.

Mr. SMITH. You say if you ceased to operate the electric plant that the wear on the boilers would be exactly the same as it would be otherwise?

Captain POOLE. Yes; I believe it would.

Mr. SMITH. Are you able to tell us anything at all about what current cost at your building under the old system?

Captain POOLE. No, sir; I am not.

Mr. SMITH. Are you aware that it has been constantly charged that it cost 15 cents a kilowatt hour?

Captain POOLE. No, sir. I have never heard that figure mentioned until you spoke of it.

Mr. SMITH. Is there any way to ascertain the truth of that charge that I told you had been charged here?

Captain POOLE. No, sir.

Mr. SMITH. Don't you know that at that time there were six separate boilers for the electric current alone?

Captain POOLE. No, sir. I do not think that statement is correct. The boilers were all interconnected, and at times the dynamo room was running with one pair of boilers, No. 5's, but I never heard of six being set aside.

Mr. SMITH. I beg your pardon; I meant 12. In the report of Bernard R. Green, superintendent of the Library building and grounds, dated January 9, 1905, it is stated that—

In the State, War, and Navy building the warming of the building and air for ventilation is accomplished by hot-water-heated boilers and by fires carried for that specific purpose. Six thousand tons of anthracite coal are burned yearly under the 24 boilers in this building, 12 of which are for heating and the other 12 for power and lighting.

Captain POOLE. That includes the elevators, and at that time it included the house pump and a number of fire pumps in addition to the generating machinery.

Mr. SMITH. So that when it says 12 are for heating and the other 12 are for power and lighting, the latter 12 included the operation of the hydraulic elevators and other apparatus in the building?

Captain POOLE. Yes, which I would estimate at that time as somewhat more than the generation of electric power.

Mr. SMITH. If they had even 6 or 5 boilers and the necessary force of firemen it would not be improbable that it would cost them in the neighborhood of 15 cents a kilowatt hour?

Captain POOLE. I still think that that figure is pretty high.

Mr. SMITH. It certainly would be far in excess of what it is costing you now and certainly far above $2\frac{1}{2}$ cents per kilowatt hour.

Captain POOLE. Certainly.

Mr. SMITH. There is no electric plant in the White House?

Captain POOLE. No, sir.

Mr. SMITH. How long has the White House been lighted from the War Department?

Captain POOLE. I am not positive of the date, sir, but I think since 1891.

Mr. SMITH. That would be probably the first time that electric lights were installed in the White House, would it not?

Captain POOLE. That I do not know, but I think so. It is my impression that the appropriation was obtained for the installation of this electric generating machinery in the State, War, and Navy building on the plea that the White House would be lighted by electricity from that source, and that helped it and made it seem a little more advisable.

Mr. SMITH. You charge the White House with this current?

Captain POOLE. Yes, sir.

Mr. SMITH. At what rate do you charge now?

Captain POOLE. Two cents.

Mr. SMITH. What was the charge until recently?

Captain POOLE. 3.6 cents.

Mr. SMITH. How recently was that change made from 3.6 cents to 2?

Captain POOLE. It was made by me on the 1st of last July.

Mr. SMITH. Do you know whether the 3.6 rate was supposed to be what it was costing?

Captain POOLE. The 3.6 rate was not figured as a unit cost, taking the whole production into consideration. It was figured more as an excess figure.

Mr. SMITH. That is, that you can produce a surplus at less than the original current?

Captain POOLE. Yes. It is something like my figures here. I think I explained to you the other day that I would not stand on these figures as a commercial man, to sell current at that figure, but I merely take these figures as what the additional expense of generating costs the Government. There are a great many things not charged here which a commercial outfit would have to charge.

Mr. SMITH. For instance, your service as superintendent of the work?

Captain POOLE. Yes. I have made no charge for that, and I have made no charge for my clerk and for the chief engineer.

Mr. SMITH. How much floor space do you occupy in this plant in the State, War, and Navy building?

Captain POOLE. For electrical generating purposes?

Mr. SMITH. Yes.

Captain POOLE. The dynamo room is about the only room entirely set aside for that. That, I should say, would be 1,440 square feet of floor space.

Mr. SMITH. The report of Bernard R. Green estimated that the vacated cubic space would be 600,000 cubic feet in the various Departments. I suppose this would be from 14,000 to 15,000 cubic feet, would it not?

Captain POOLE. Yes. It has a 9-foot ceiling to the I beams. There are brick arches between the I beams.

Mr. SMITH. Your plant is the most modern of any of the Government's electric plants, so far as you know, is it not?

Captain POOLE. The plant in the new municipal building is as recent as mine.

Mr. SMITH. They have put one in, have they?

Captain POOLE. It is being put in. The boilers are all in, I know, and I think the electric generating apparatus is being set up. I know it has been contracted for.

Mr. SMITH. Aside from that, yours is the newest in the Government buildings, so far as you know?

Captain POOLE. Yes, sir.

Mr. SMITH. Have you charged anything in this figure of yours for maintenance, aside from depreciation?

Captain POOLE. Nothing except the oil and waste.

Mr. SMITH. At the navy-yard they charge 10 per cent for maintenance. Have you had sufficient experience to know whether such a charge ought to be made or not?

Captain POOLE. The expenditure for that purpose with the plant thus far has certainly not come anywhere near that figure. I suppose that is for current repairs.

Mr. SMITH. Yes; and to maintain it at a high standard.

Captain POOLE. I might also say that the maintenance is paid for in my pay roll; that is, we are self-supporting. I have a machine shop, and I have a machinist, and we do all our own repairs.

Mr. SMITH. Well, material is required for those repairs, is it not?

Captain POOLE. Yes, sir.

Mr. SMITH. You have nothing but oil and waste charged, though?

Captain POOLE. That is all.

Mr. SMITH. You spoke about using these dynamo men to repair the hot-water heating system. Don't you have anybody, either a steam fitter or a plumber, constantly employed about that building?

Captain POOLE. I have one plumber.

Mr. SMITH. Does not he, in fact, do most of this repairing of the hot-water system?

Captain POOLE. He would help, sir.

Mr. SMITH. Would he not do practically all of it?

Captain POOLE. No, sir; not by a good deal.

Mr. SMITH. Is a dynamo man adapted for anything but a helper about such work?

Captain POOLE. He would occupy about the position of a steam fitter's helper.

Mr. SMITH. You could not use three helpers to one man, could you?

Captain POOLE. I have a skilled laborer who was formerly a steam fitter in the building when it was put up. I could use him as a first-class steam fitter.

Mr. SMITH. You do not mean, Captain, that it would take five men five months in a year, or four months in a year, to keep in repair the hot-water plant in the building, or anything like that, do you?

Captain POOLE. You realize, of course, that an answer to that question would have to be rather complex. I do not expect to have those five men start in at once and keep them constantly at work

for five months on the heating system. There are 48 toilet rooms containing hundreds of closets, and there is a great deal of work to do to keep them in order, and the plumber has got to have a man to go up with him on that work.

Mr. SMITH. You have a skilled laborer who could go with him?

Captain POOLE. Yes. That cuts it down to three men; and if one man is off on leave, that is two men; and if one is sick, that leaves one man. If you have ever seen a steam fitter making a joint on a 14-inch pipe you will have noticed more than one or two men around the joint. [Laughter.]

Mr. SMITH. Seriously, Captain, do you think it requires the services of five men, taking out their leave for five months in a year, to keep the heating apparatus and the plumbing of that building in repair, or anything like such an amount of labor?

Captain POOLE. No, sir; I think it would not on the heating system alone.

Mr. SMITH. And the plumbing?

Captain POOLE. Five months in the year?

Mr. SMITH. Yes.

Captain POOLE. It would take them a good deal more than five months in the year if they kept the plumbing in order all the year. Of course one or two of those five men are on the plumbing all the rest of the year.

Mr. SMITH. Plumbing and steam fitting?

Captain POOLE. Yes; where they can lend a hand.

Mr. SMITH. Is there anything further, Captain, that you think you could tell us on this subject?

Captain POOLE. No, sir; there is not. I have made a little memorandum here in which I have tried to draw up my ideas on the subject, if you care to hear it.

Mr. SMITH. If it is in such form that it can be put into the hearing you can hand it to the reporter and we will have it printed as part of your statement.

Captain POOLE. I have attempted to show wherein it can not be economical for a building to produce its light and power. To my mind it is absurd for the smaller buildings to try to do it; but for the larger buildings, I think there is no doubt but that it is more economical.

(Following is the statement filed by Captain Poole:)

When a building is of such a size that to care for the heating system, elevators, elevator machinery, house pumps, fire pumps, and other absolutely necessary mechanical accessories necessitates the employment of skilled engineers and firemen, and where it is possible to combine the electric lighting of the building with the heating and other necessary uses of fuel consumption, the production of the necessary electric current in this building can be carried on at a less cost per kilowatt hour than the same can profitably be supplied to the building from an outside central station.

When the heating and power functions of the plant are separate, the outside central station undoubtedly has the advantage. No large departmental or other Government building should be entirely dependent for light and power on any one plant, and especially not on any one commercial plant.

The ideal equipment for a large Government building is a compact and economical heating, lighting, and power plant in the building, capable of furnishing all necessary heat, light, and power to the building at any time, an emergency breakdown connection with some large central power station from which power could be immediately drawn in case of a breakdown to the local plant, and which will supply current at a low

figure during the five months of the year when no heat is necessary in the building, and when, on account of this, the local power plant loses its great advantage of combining the heating and power features. In this way not only is the greatest economy obtained, but the reliability of the service is increased 100 per cent over a service depending on one plant, either in the building or in a large central power station.

INTERIOR DEPARTMENT BUILDINGS.

STATEMENT OF MR. J. S. HILL, CHIEF ENGINEER.

MR. SMITH. Mr. Hill, I wish you would kindly state what official position you hold under the Government.

MR. HILL. I am chief engineer of the Interior Department buildings.

MR. SMITH. By "the Interior Department buildings" you include what is commonly called the Patent Office and the old Post-Office building?

MR. HILL. Yes, sir.

MR. SMITH. Anything else?

MR. HILL. Only so far as the lighting of the Pension building is concerned. I have charge of that. We light these buildings. We heat the Patent Office building and the old Post-Office building.

MR. SMITH. But not the Pension Office building?

MR. HILL. No.

MR. SMITH. It is heated by a plant of its own?

MR. HILL. Yes. We light also the Civil Service building.

MR. SMITH. The Patent Office, the old Post-Office building, the Civil Service building, and the Pension building?

MR. HILL. Yes, sir.

MR. SMITH. Mr. Hill, how modern is your electric plant?

MR. HILL. It was installed about six years ago.

MR. SMITH. I wish you would state in general what the character of it is, and what the connection is with the heating plant for the two buildings.

MR. HILL. Formerly the Patent Office building was heated with seven boiler plants in all, and they also had a small lighting plant with a capacity of about 800 incandescents, and it was heated partly with steam and partly with hot water when I first came there. About six years ago we changed that to the present plant. The old Post-Office building was heated with a separate plant also, which was hot water, and we included that in with this present plant.

MR. SMITH. Where is the present plant? In which building?

MR. HILL. In the old Post-Office building, in the courtyard.

MR. SMITH. Below the surface?

MR. HILL. It is right on the surface. The boilers are below the surface, and the plant proper, the engines, are on the surface.

MR. SMITH. You have some buildings in the court to inclose them?

MR. HILL. Yes; a small building formerly used as a mail room by the post-office and afterwards as a museum. When we first went there they had the museum moved out of there, about eight years ago. That building was heated with hot water from this plant in the old building, and when we installed the new central plant we changed that, and still retained the hot water until two years ago, and changed that to the vacuum exhaust system—steam—and we have been run-

ning that now a little over two years with the exhaust from the engines. -

Mr. SMITH. At what rate do you charge for the current that goes to the Civil Service building?

Mr. HILL. We have not fixed any rate for that. We simply put in a figure as near as we can, about what proportion of coal; but I do not remember now just what that is. I have not those figures.

Mr. SMITH. Is there any separation, then, of the expense of lighting the Civil Service building from the Interior Department buildings?

Mr. HILL. Not at present.

Mr. SMITH. And never has been?

Mr. HILL. No, sir.

Mr. SMITH. Is there any separation of the cost of lighting the Pension building from the other buildings?

Mr. HILL. They are separating it this year. I should correct that statement and say they are beginning to separate it this year, but up to this time it never has been separated.

Mr. SMITH. You have a proper meter there so as to determine what the actual production per kilowatt hour is of your plant?

Mr. HILL. No, sir; we have no recording meters of any kind.

Mr. SMITH. You do not know how much you are producing?

Mr. HILL. Only in this way—by measuring the kilowatts by the voltage and amperes roughly. We have a log on each watch, showing the amount of coal used per day on each watch of eight hours. We run continuously, and the number of amperes and volts are multiplied together, which produces the watt, and of course divided by 1,000 equals the kilowatt, the kilowatt hour. We have never installed a recording watt meter because we did not think it was necessary.

Mr. SMITH. Then you are not able, with the same accuracy, to tell what the current actually costs you per hour as you would be if you had a watt meter?

Mr. HILL. No, sir.

Mr. SMITH. As near as you can tell, what do you say it costs you to produce your power?

Mr. HILL. I have a memorandum of a report I made to the Secretary last year in regard to this, and I want to say that this was made for two types of coal. We were using soft coal and we were also using hard coal. It makes a difference in production. By charging as near as we could all the various items, it made a difference of kilowatts produced something like four or five hundred thousand a year, and about 3.69 on hard coal and 2.71 on soft coal per kilowatt hour.

Mr. SMITH. That is what you estimated it at?

Mr. HILL. Yes.

Mr. SMITH. And you have had no reason to change that since?

Mr. HILL. Yes; I think we could change that now. I think we are producing it for much less. We have increased the output considerably, and, of course, it cuts down the actual expense per kilowatt.

Mr. SMITH. In making this estimate, what portion of the force have you charged to the electric current?

Mr. HILL. I want to say first that when this plant was consolidated the force was consolidated from two buildings, the Patent Office and the old Post-Office building, in one. There were two engineers in

each building, and four firemen in one and seven in another, making eleven in all. That force was consolidated, and since has not been added to. There has never been a man hired extra for producing current.

Mr. SMITH. There should not have been any added. It should have been reduced, ought it not?

Mr. HILL. Not when you consider the size of the plant.

Mr. SMITH. Is it not a fact that the consolidation of the plant would reduce the number of men instead of increasing it? You did not require any more space?

Mr. HILL. It was simply a heating plant for the two buildings.

Mr. SMITH. You say you never added anything to the force when you added an electric current for the four buildings?

Mr. HILL. We never added a man to the force.

Mr. SMITH. Have you dynamo tenders now?

Mr. HILL. We have engines for that purpose. They tend the dynamos as well as the engines, and we also use these men for all repairs. We have no steam fitters and no blacksmiths or machinists or anything of that kind.

Mr. SMITH. Have you a plumber?

Mr. HILL. Yes. That is separate from the plant.

Mr. SMITH. And have you skilled laborers to assist the plumber?

Mr. HILL. They are all common laborers.

Mr. SMITH. You do not have any plumber's assistants or helpers?

Mr. SMITH. No helpers of any kind.

Mr. SMITH. Now, with the consolidation of the heating plants, you could have reduced the force if you had not added the electric plant?

Mr. HILL. If we had simply put in the heating plant we could.

Mr. SMITH. Have you got automatic stokers there?

Mr. HILL. Yes, sir.

Mr. SMITH. You did not have them in the old plant?

Mr. HILL. No, sir.

Mr. SMITH. That, of course, would have reduced the force considerably if you had not put in the electric plant?

Mr. HILL. Yes, sir.

Mr. SMITH. What do you say would have been the force requisite to run the plant alone?

Mr. HILL. Well, in making up this list we charged the chief engineer and one assistant and six firemen against the plant.

Mr. SMITH. Against the electric plant?

Mr. HILL. Yes, sir.

Mr. SMITH. How many firemen have you altogether?

Mr. HILL. We have eleven in all.

Mr. SMITH. Would it require five firemen to run the heating plant alone?

Mr. HILL. Yes, sir.

Mr. SMITH. Now, if you had only the heating plant, you would not need the two chief engineers?

Mr. HILL. We have only one chief engineer.

Mr. SMITH. You charge the whole to the electric plant, do you?

Mr. HILL. We have three assistant engineers.

Mr. SMITH. Would you need three assistant engineers if you had only the heating plant there?

Mr. HILL. No, sir.

Mr. SMITH. How many would you need?

Mr. HILL. With the heating plant we would probably need about two, but in this connection I do not know exactly how we would separate them, because we would have to keep some for the two hydraulic elevators besides the heating plant. We have two hydraulic and two electric elevators.

Mr. SMITH. Which was put in the later, the hydraulic or the electric?

Mr. HILL. The electric. That has been added since the plant was installed.

Mr. SMITH. Do the same boilers produce the steam under the new system for the electric plant and the heating plant?

Mr. HILL. Yes, except those in the old Post-Office building, which we now use with exhaust steam——

Mr. SMITH. And the vacuum system?

Mr. HILL. Yes, and we also have an estimate in this year to change the Patent Office heating system to the vacuum also, and use the additional exhaust steam which we now throw away. We have entirely more exhaust steam now than is necessary to heat that building. That will make a saving.

Mr. SMITH. In view of the fact that you are conducting the lighting of four or five buildings and the heating of only two, there ought to be enough exhaust steam to heat the other two.

Mr. HILL. There would be in the daytime. Of course, in the night the load is light. Then we have to put in some additional live steam to keep it up. I made a comparison here with the Treasury, which has its own plant. They have one chief engineer, four assistants, three firemen at \$720, and five firemen at \$660, and one coal passer at \$500, making in all \$10,360.

Mr. SMITH. They have not automatic stokers, have they?

Mr. HILL. I do not think they have.

Mr. SMITH. That would make a great difference?

Mr. HILL. It would make some difference, but their plant is somewhat scattered. They have several boilers.

Mr. SMITH. They also have a much larger building than yours?

Mr. HILL. It would not be nearly as much.

Mr. SMITH. You have not that figure?

Mr. HILL. If you take the size of the Treasury building, and then that of the Patent Office and Post-Office building, and compare them, you will see——

Mr. SMITH. Without any information as to the relative cubic feet to heat, and without positive information as to whether they have automatic stokers, these figures would not throw much light on the relative cost, would they?

Mr. HILL. I do not know about that part of it.

Mr. SMITH. You would not regard them as very enlightening, without any knowledge as to the relative cubic contents?

Mr. HILL. You spoke a while ago about whether a chief engineer would be necessary and three assistants. If it was simply a heating plant, it would apply to any heating plant, whether large or small.

Mr. SMITH. Not in the Treasury building. The Treasury building has a very scattered plant, has it not?

Mr. HILL. I do not know how many boilers they have there, but I think they have three plants. Between their employees and ours there is only \$3,800 difference.

Mr. SMITH. Allow me to read you from Mr. Bernard R. Green's report on this general subject [reads]:

The Treasury building is warmed principally by water heated directly by fires under six boilers, located at two points. Lighting and partial power service is performed by purchased electric current. Steam is used to a limited extent for power, and in the winter season the exhaust steam is used for heating. The condition of the building is one of such congestion that space has not been, and is not now, available for the installation and working of a lighting and power plant adequate to the requirements of the building. Hence the heavy annual cost attending the purchased service and the rank of the building as the most expensively operated of all the executive group.

You would not like to make a comparison with that? How many boilers have you?

Mr. HILL. We have five.

Mr. SMITH. And they have six?

Mr. HILL. Yes. The Patent Office, as I stated, has seven plants, and there was a boiler in each place; in fact, there were two in one place, and each one of the others had a boiler separate.

Mr. SMITH. You have not yet introduced the watt meter over there?

Mr. HILL. No.

Mr. SMITH. Is the installation of a watt meter so expensive as to require a special appropriation?

Mr. HILL. No, sir. We have never had a call for it, and of course we have never had one installed for that reason.

Mr. SMITH. If, as a matter of fact, the saving by the consolidation of the heating and power plant is as great as is contended for here by some parties, why ought we not to have an electric plant in a great building like the Pension building?

Mr. HILL. Because we furnish the current for them now.

Mr. SMITH. But the contention here is that the gain from the use of exhaust steam is so great that it makes it cheaper to produce the electric current. Now, both at your place and the Pension building you are throwing away your exhaust steam—that is, largely so at your place and wholly so at the Pension building. Is that true?

Mr. HILL. The Pension building has only two elevator pumps, but they utilize their exhaust steam through them.

Mr. SMITH. You can utilize exhaust steam when you do not have any dynamos to exhaust the steam, so to speak?

Mr. HILL. With the steam pumps; they have two steam pumps for running the hydraulic elevators.

Mr. SMITH. What are they run with?

Mr. HILL. They are run with steam.

Mr. SMITH. Live steam?

Mr. HILL. Yes, sir; and the exhaust steam from those pumps is carried into the mains with the addition of the live steam from the pumps, and they claim that they save the steam from one boiler there—that is, they can run it with three boilers where they used to have to be run with four ordinarily.

Mr. SMITH. But for that electrical plant here you could utilize it with live steam that they are now using for heat, for producing current and also for heating purposes?

Mr. HILL. You can hardly figure it that way.

Mr. SMITH. But that is the way they are figuring with all the other Departments.

Mr. HILL. You can not say that you can use the steam over and over and get the result of that again.

Mr. SMITH. Is that not just what you mean that you are doing when you say you are using exhaust steam to heat the Post-Office building; do you not mean that you are using the live steam to generate the electric and then using that same steam for heating purposes?

Mr. HILL. Yes, sir; that is what I mean, but I do not mean to say that it will be necessary to run the engine in order to produce exhaust steam.

Mr. SMITH. Certainly not; but it is economical to use the steam twice in this way, is it not?

Mr. HILL. Yes, sir.

Mr. SMITH. Now, they only use it once at the Pension building—that is, so much of it except as is used in the hydraulic elevators?

Mr. HILL. Yes, sir.

Mr. SMITH. They use the live or dry steam for their elevators—that is, the great body of it is live or dry steam, is it not?

Mr. HILL. Yes, sir.

Mr. SMITH. Now, is it more economical to combine the two in that way, as here contended; why would it not also apply to putting in an alternating plant in the Pension building instead of having to create so much more of dry steam at a place and generate current and send it over to the Pension building?

Mr. HILL. Well, it would, provided you threw away this steam. As I said before, if we could change the Patent Office building so that we could use the exhaust steam in there, that would be sufficient to heat that building, then you would still be generating current for the Pension Office too.

Mr. SMITH. But you are now throwing it away?

Mr. HILL. Yes, sir; because the system is not suitable for this purpose.

Mr. SMITH. You are throwing away your exhaust steam at the present plant, and in the other plant you are using, whatever you call it, dry steam or live steam——

Mr. HILL. Live steam.

Mr. SMITH. I believe that is dry steam—directly, when you could use it practically as well for heating purposes after you have generated the current with it; so you are losing at both ends?

Mr. HILL. No, sir; I would not say that we were losing at both ends. If we can utilize the exhaust steam which we are now throwing away for the Patent Office and still generate the current for the Pension Office, it would be much more economical than it is now.

Mr. SMITH. If I understand the contention of nearly all of these gentlemen—and this is entirely impersonal—it is that using the steam twice is a great economy?

Mr. HILL. Yes, sir.

Mr. SMITH. Now by your present system you are only getting the use of it once at both plants largely; is that not correct?

Mr. HILL. We are only using a certain portion of it.

Mr. SMITH. It is a great portion of it, is it not?

Mr. HILL. The greater portion of it is going away on dark days.

Mr. SMITH. The greater portion of it at the Interior building is being thrown away?

Mr. HILL. Yes, sir.

Mr. SMITH. And the greater part of it is only being used once at the Pension Office instead of twice, is that correct?

Mr. HILL. There is another thing that we have to consider, too, in the Pension Office building, and that is that their boilers are not suitable for the installation of electric generators and engines. They are what we term low-pressure boilers, and while they are run on 60 pounds of steam, by running their elevator pumps, it would not be sufficient to run electric generators at that pressure.

Mr. SMITH. In your figures, such as they are—and I believe you do not claim that they are very accurate—as to the cost per kilowatt hour, how much do you charge for depreciation?

Mr. HILL. We charge 4 per cent, but it would not run near that.

Mr. SMITH. You are aware, are you not, that practically every plant charges 10 per cent?

Mr. HILL. No, sir.

Mr. SMITH. Absolutely every witness who has been here testified that that is regarded as the standard everywhere.

Mr. HILL. I can give you a few figures as to the way in which depreciation is charged on a \$50,000 plant, that is the estimated cost, at 4 per cent; repairs to boilers, \$350, and engines, that is for one year, \$77.15. That is about all the depreciation in that part of the plant.

Mr. SMITH. How about your dynamos?

Mr. HILL. We have not spent a cent on the dynamos.

Mr. SMITH. But are they as good as they were? I am not talking about repairs, but depreciation.

Mr. HILL. They are just as good as they ever were.

Mr. SMITH. There is just as long life ahead of them?

Mr. HILL. Yes, sir; if the dynamos are not abused. Of course it is something that you can not tell positively; but I have never seen a dynamo of that class burn out.

Mr. SMITH. So that without charging any interest whatever on the investment and without charging anything for maintenance aside from the 4 per cent—you have simply put in 4 per cent, which is all that is in this estimate of cost to cover interest on the investment, the depreciation in the plant, and the maintenance of the plant; is that correct?

Mr. HILL. Yes, sir.

Mr. SMITH. If you had not installed the electric plant and had used commercial current, this entire old mailing room would have been vacant, would it not?

Mr. HILL. Yes, sir.

Mr. SMITH. The heating plant being entirely beneath the surface?

Mr. HILL. Yes, sir.

Mr. SMITH. Do you know what the floor space of that mailing room is?

Mr. HILL. I do not know exactly. I think it is 50 feet wide by about 60 or 70 feet long; something like that.

Mr. SMITH. And 9 or 10 feet high?

Mr. HILL. It is higher than that. I suppose it is 14 feet to the ceiling. I want to say, however, that this room was not available for anything but files. It is very hot in the summer time.

Mr. SMITH. They are asking us to appropriate some hundreds of thousands of dollars for a filing room at those buildings just now.

Mr. HILL. Yes, sir; there was a proposition to put another story on top of this. This is just a one-story building now where the engines are located, and there is a proposition to put another story on that. That would give them additional space for one division.

Mr. SMITH. Is there anything else that you think you could give us in the way of information as to how much it is costing over there for current?

Mr. HILL. I only have these rough figures; that was all that was submitted on the request of the Secretary of the Treasury at the time.

Mr. SMITH. What would it cost to install a Watt meter there, about?

Mr. HILL. I suppose about \$300.

Mr. SMITH. I am unable to understand how you are able to furnish this current for the Civil Service Commission without charging anything for it. Can you explain that to us?

Mr. HILL. Well, no, sir; I can not explain that matter to you. I simply have charge of running the plant. I do not know how the appropriations are divided up.

Mr. SMITH. Is there anything further, Mr. Graff?

Mr. GRAFF. I understood the witness to say something about his opinion being that the estimate which he gave there was larger than he would make at the present time, did he not?

The CHAIRMAN. Yes.

Mr. GRAFF. But he did not follow that up by saying what that present estimate would be?

Mr. HILL. I said that the lowest—I have here the figures—was about 2.71 cents per kilowatt hour, and I would put it at the outside figure now $2\frac{1}{2}$ cents.

The CHAIRMAN. Now you give us two figures there?

Mr. HILL. One was on anthracite and one on bituminous coal.

Mr. SMITH. What are you using now, as a matter of fact?

Mr. HILL. We are now using bituminous coal.

Mr. SMITH. Constantly?

Mr. HILL. Yes, sir; the change was made on account of the smoke law. We had only three boilers at one time, and we had to force those boilers considerably and violated the smoke law, and the former Secretary then ordered the use of anthracite buckwheat coal, and we had installed those stokers for that purpose. Those stokers, however, will burn either kind of coal, and we used that up to a short time ago, but in the meantime we had to put in two larger boilers, and, of course, we can now run without violating the smoke law, using soft coal. It is simply a matter of great service; that is all there is to it. There is no such thing made as a smoke consumer, but it is a preventative. We have no difficulty in running, and probably we will continue to run with soft coal.

Mr. SMITH. Is there anything further that you care to ask, Mr. Graff? If not, is there anything further that you desire to say, Mr. Hill?

Mr. HILL. I do not know anything else, except that I would like to say that in the event of the plant shutting down it would be a serious question in case the other power house broke down, as this present company, I understand, has only one power house that it can depend upon. What would we do in that event?

Mr. SMITH. Do like the other inhabitants of the city of Washington.

Mr. HILL. We have no gas; the gas was all cut off, and I would like to state that it would be a great disadvantage to have the plant entirely at the mercy of one power house. There have been a number of burnouts at various places.

POST-OFFICE DEPARTMENT BUILDING.

STATEMENT OF CHARLES A. CONRARD, CHIEF CLERK, ACCOMPANIED BY MR. J. E. WOODWELL, INSPECTOR OF ELECTRIC-LIGHT PLANTS, TREASURY DEPARTMENT, AND MR. G. F. SHAW, ASSISTANT SUPERINTENDENT POST-OFFICE DEPARTMENT BUILDING.

Mr. SMITH. Mr. Conrard, what do you know as to when the present electric plant was established in the Post-Office Department?

Mr. CONRARD. My understanding is that it was established with the completion of the building.

Mr. SMITH. That was about ten years ago, or in that neighborhood, was it not?

Mr. CONRARD. Well, we moved in in 1899. I do not know whether all the present machinery was installed at that time or not.

Mr. SMITH. Do you know what the system is down there, as to being combined heating and electric-power plant?

Mr. CONRARD. Well, it is a combined heating, power, and electric-light plant.

Mr. SMITH. Have you not down there what is known as the wattmeter?

Mr. CONRARD. Yes, sir; as I understand it, our current is measured; that is, the current we furnish the building from the electric-light plant is measured by the wattmeter. I would like to say this: That I am not an electrical engineer, and have only been in charge in the chief clerk's office for a couple of months.

Mr. SMITH. I was in doubt when you came in whether or not you would be able to give us the information we wanted; that is, whether you would be sufficiently familiar with the plant there to do so.

Mr. CONRARD. I have had this done: I had my assistant superintendent, Mr. Shaw, and Mr. Woodwell, the inspector of electric-light plants, Treasury Department, and who, by the way, had charge of the acceptance tests of the Post-Office plant, go through the whole business and prepare a statement for me. I have brought Mr. Shaw with me and Mr. Woodwell happens to be out in the next room, and while I do not want to make any suggestions to the committee with regard to the technical end of it, it might be better, perhaps, to have Mr. Woodwell answer any technical questions.

Mr. SMITH. Suppose you ask them to come in, and we will examine all three together, so to speak.

(Mr. Woodwell and Mr. Shaw were invited into the room.)

Mr. SMITH. Gentlemen, thinking that Mr. Conrard, by reason of his not being directly connected with the management of the plant, might need some suggestions, the committee has thought proper to ask you gentlemen to come into the room. Now, what is your estimate of the cost per kilowatt hour of the current produced at the Post-Office building?

Mr. CONRAD. It is 2.8 cents.

Mr. SMITH. Are the boilers used for the production of current the same boilers that are used for the production of heat and hydraulic power?

Mr. CONRAD. They are.

Mr. SMITH. So that it becomes to some extent difficult to determine just exactly what part should be charged to the current and what part charged to heat?

Mr. CONRAD. Will you allow Mr. Woodwell or Mr. Shaw to answer that question?

Mr. SMITH. Either one of them; whichever can answer it the better.

Mr. WOODWELL. It is possible to approximate the cost chargeable to the cost of the production of electric current, though it is impossible, of course, to obtain it from any actual records and actual figures.

Mr. SMITH. Is there any standard table, or the like, upon which those computations are made generally, or is it each man making his estimate generally as to what shall be charged to each?

Mr. WOODWELL. It depends in each case on the performance of the machinery, which, if one has had the benefit of an operating test that we have relied upon in this case, can be very closely approximated.

Mr. SMITH. Do you buy current at any season of the year there?

Mr. CONRAD. Not for the main building.

Mr. SMITH. Does the main building electric plant supply current to any other building?

Mr. CONRAD. No, sir.

Mr. SMITH. What force is employed distinctively in the production of electric current?

Mr. CONRAD. About the only ones would be the three dynamo tenders, I suppose.

Mr. WOODWELL. That is correct.

Mr. SMITH. What is the system of heating employed in the Post-Office building?

Mr. SHAW. Direct for the first floor and indirect for the rest of the building.

Mr. SMITH. That scarcely answers the question, or may not be comprehensible to me owing to my lack of technical knowledge. Is it a hot-water system?

Mr. SHAW. It is steam.

Mr. SMITH. Does it use exhaust steam?

Mr. WOODWELL. Altogether, except in very cold weather.

Mr. SMITH. What system of exhaust steam is it; is it what is called the vacuum system?

Mr. WOODWELL. Yes, sir; the vacuum system.

Mr. SMITH. Would the same number of employees be necessary if you heated it with dry steam or live steam? Perhaps I can make plainer what I mean. Have you automatic stokers down there?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. So that the number of men employed about the firing is very limited, is it not?

Mr. SHAW. Well, it is sufficient; that is about all.

Mr. CONRAD. Are the 11 firemen all engaged in the main building?

Mr. SHAW. No, sir; 9 in the main building.

Mr. SMITH. Now, if you were using dry or live steam would that number of firemen be necessary?

Mr. WOODWELL. If I understand the question correctly, it is with regard to arriving at the saving of labor which would be effected if the electric plant would be abandoned?

Mr. SMITH. Yes; and everything.

Mr. WOODWELL. Mr. Conrard has the report here which I prepared jointly with Mr. Shaw, which makes an exposition of all those facts and gives as a matter of record our opinion on that very point and also on the other points in regard to which you have just spoken.

Mr. SMITH. Is that report here?

Mr. CONRARD. I have it here.

Mr. SMITH. Just hand it to the reporter and let him incorporate it in the record.

Cost of operation of electric-light plant May 1, 1907, to April 30, 1908, United States Post-Office Department building.

1. ON PRESENT BASIS.

Fixed charges.—The valuation of the electric plant, including engines, generators, steam piping, generator switchboard, panels, etc., based on cost of installation as shown by contract records of the Treasury Department is \$24,000 in round figures. Interest and depreciation will be taken on the basis of the life of the plant of fifteen years, and it will be assumed that the plant will be 25 per cent of the original value at the end of that period. Interest will be taken at 2 per cent per annum, the Government rate. The sum of \$24,000 must be written off in fifteen years with interest at 2 per cent, the value of the plant being 25 per cent of its original value. The actual amortization fund would then amount to $\$24,000 \times \frac{.02[(1+.02)15-.25]}{(1+.02)15-1} = \$1,520.50$:

Repairs.—The actual repairs of record amounted to \$76.75, but it is deemed proper to make the estimate of 2 per cent per annum to cover the average expense, as the older and more deteriorated the plant becomes the larger this item. Extended experience indicates that 2 per cent per annum will cover the average cost of repairs throughout the life of the plant, so that the cost of repairs will be \$480.

(NOTE.—It will be noted that the annual charges for depreciation, interest, and repairs amount to \$2,000.50, or over 8 per cent per annum, based on the cost of installation of the plant, and are therefore comparable with the customary 10 or 12 per cent charged in private undertakings subject to higher rates of interest.)

Fuel.—Total coal consumption (anthracite), 4,217.3 tons, costing \$18,478.32. Removal of ashes, \$900.45. Total cost of fuel, including removal of ashes, \$19,378.77, or \$4.595 average price per ton.

The above gross coal consumption includes the coal required to operate the extensive heating and hydraulic elevator plants and dependent boiler auxiliaries as well as the electric light and power plant. The amount and cost of fuel chargeable to the production of electric current has been determined on the basis of 7 pounds of coal per kilowatt hour (this factor is based upon data derived from the actual acceptance tests of the engines and generators at the Post-Office Department plant modified by actual operating tests and cost records of the electric-light plants under the control of the Treasury Department, to allow for the inevitable losses and reduction in efficiency obtaining under actual operating conditions).

The output of the year was 582,978 kilowatt hours, and therefore the gross coal consumption of the electric light and power plant was $582,978 \times 7 = 4,080,846$ pounds, or 1,821.8 tons. During the heating season at least 90 per cent of the exhaust steam from the electric-light engines is available for heating, and it has been found by extended experience in similar plants in this latitude that at least 90 per cent of one-third of the gross steam consumption for one year is actually available for heating. The net fuel consumption of the electric plant is then found by deducting 90 per cent of $\frac{1821.8}{3}$, or 546.9 tons, from the gross amount of 1,821.8 tons, leaving 1,274.9—say 1,275 tons (net). In other words, 1,275 tons of coal would be saved by discontinuing the operation of the electric plant.

The net cost of fuel, including removal of ashes, is then $1,275 \times \$4.595$ per ton, or \$5,858.63.

Labor.—The engineer force of the building comprises the following employees:

1 chief engineer.....	\$1,400
7 assistant engineers, at \$1,000.....	7,000
3 dynamo tenders, at \$900.....	2,700
	<hr/>
	11,100

Of the above force the salaries of 1 assistant engineer and 3 dynamo tenders should be charged to the production of electric current, as the services of these employees could be dispensed with in the event of discontinuance of operation of the electric plant, making a total of \$3,700.

The boiler-room employees and mechanics consist of—

11 firemen, at \$720.....	\$7,920
10 coal passers, at \$500.....	5,000
1 steam-fitter fireman.....	900
1 blacksmith fireman.....	900
	<hr/>
	14,720

If the labor cost incident to the production of electric current is prorated in the proportion that the net coal consumption of the electric plant bears to the total coal consumption of the building, the cost of such labor would be $\frac{1,275}{4,217} \times \$14,720$, or \$4,450.56, and the total cost would equal \$8,150.56.

The services of electricians are required in any event and are not essential to the production and delivery of electric current to the main switchboard.

Water.—The water is supplied by the Government without direct charge, but the extra quantity used in the production of electric current figured at actual cost would be so small in amount as to be practically negligible.

Supplies.—Lubricating oils: The cost of lubricating oils for the entire plant, including hydraulic elevator, ventilating, and auxiliary machinery, as well as the electric plant, was \$172.34; as a fair estimate one-third of this amount should be charged to the production of electric current, or \$57.45. Cotton waste: The total cost of cotton waste for complete plant was \$88, and one-third should be charged as above, \$29.33. Miscellaneous: Packing for engines, \$244.10—\$330.88.

SUMMARY.

The items of cost of production of electric current are recapitulated as follows:

Fixed charges (interest and depreciation).....	\$1,520.50
Repairs.....	480.00
Fuel.....	5,858.63
Labor.....	8,150.56
Water.....	
Supplies:	
Lubricating oils.....	\$57.45
Cotton waste.....	29.33
Miscellaneous.....	244.10
	<hr/>
	330.88
	<hr/>
	16,340.57

Cost per kilowatt for production of 582,978 kilowatt hours for the period from May 1, 1907, to April 30, 1908, $\frac{16,340.57}{582,978}$, or \$0.0280; say 2.8 cents per kilowatt hour.

2. IN EVENT OF DISCONTINUANCE OF OPERATION OF THE ELECTRIC PLANT.

The foregoing statement under heading (1) is subject to modification as follows, to indicate the actual reduction in operating expenses of the building which would take place if the operation of the electric plant was discontinued.

Under the latter condition the fixed charges would remain practically the same, the investment in the plant would have no productive value and deterioration of the machinery would not be diminished.

Under the item of labor the only positions that could be dispensed with were electric current purchased, would be as follows:

1 assistant engineer.....	\$1,000
3 dynamo tenders, at \$900.....	2,700
4 firemen five months, at \$720.....	1,200
2 coal passers, at \$500.....	1,000
	<hr/>
	5,900

The items of supplies and plant repairs as reported under heading (1) would be saved so that the reduction in cost due to discontinuance of the electric plant would be as follows:

Fuel.....	\$5,858.63
Labor.....	5,900.00
Supplies.....	330.88
Repairs.....	480.00
	<hr/>

12, 569.51

or at the rate of $\frac{\$12,569.51}{582,978}$, or \$0.0216 per kilowatt hour.

Against the above reduction must be charged the cost of purchase of electric current from the Potomac Electric Power Company, which, at the rates proposed in section 9 of the sundry civil bill (H. R. 21260), would depend upon the aggregate annual consumption. Under the most favorable conditions, however, the average rate proposed would not be less than 3 cents per kilowatt hour, so that the cost of purchasing 582,978 kilowatt hours would be at least \$17,489.34.

The purchase of electric current at such terms would therefore result in an increase in the total cost of operation of \$17,489.34—\$12,569.51=\$4,919.83, or nearly \$5,000 per annum.

Respectfully,

J. E. WOODWELL,
Inspector of Electric Light Plants, Treasury Department.
G. F. SHAW,
Assistant Superintendent Buildings, Post-Office Department.

MR. SMITH. Are you burning anthracite or bituminous coal down there?

MR. CONRAD. Anthracite.

MR. SMITH. Is that made necessary by reason of your inadequate number of boilers?

MR. CONRAD. No, sir.

MR. SMITH. Would an increased number of boilers enable you to burn bituminous coal without violating the smoke law?

MR. CONRAD. It would not be necessary to increase the number of boilers. The boilers were changed to anthracite by an act of Congress which made an appropriation in 1906—that is, the fiscal year 1906.

MR. SMITH. You have charged as interest and depreciation here \$1,520.50. What portion of that is charged as interest, and what proportion as depreciation, and what is the correct percentage?

MR. WOODWELL. The correct percentage is approximately 6½ per cent, including interest and depreciation. That is based upon an assumed plant value, or rather an actual value, according to the contract figures of \$24,000, upon which an annual charge of 2 per cent is allowed for interest. A sinking fund is figured by an annuity, which will replace the original investment at the end of the life of the plant, which is estimated at fifteen years, assuming that the plant has 25 per cent of its original value at the end of its life.

MR. SMITH. Is that basis justified?

MR. WOODWELL. Absolutely.

MR. SMITH. It appears from the testimony taken this morning that it is customary to compute the depreciation at 10 per cent. Is that

a higher interest rate that private parties pay than the Government pays?

Mr. WOODWELL. This rate of interest and depreciation that we have charged corresponds to the commercial rate of charge, amounting to 10 or 12 per cent for the same items.

Mr. SMITH. That is to say, if a private establishment charged 10 per cent to depreciation your theory is that it would be 5 or 6 per cent interest?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. Leaving only perhaps 4 or 5 per cent for deterioration?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. That is, we get money at 2 per cent, and it is therefore proper to take the depreciation at a lower rate on Government work?

Mr. WOODWELL. It appears to be a fair way to figure it.

Mr. SMITH. And that is the basis of your calculation, is it?

Mr. WOODWELL. Yes, sir; we know from actual experience that such plants have a life in excess of fifteen years; the Treasury Department has abandoned a number of plants after a life exceeding fifteen years.

Mr. SMITH. Well, is it not true that those plants were operated beyond the time that they should have been operated, and would have been operated, by any wise business man?

Mr. WOODWELL. No, hardly; in fact, I think we abandoned them in order to modernize the plants prior to the date of their actual breakdown.

Mr. SMITH. I know there have been a number of breakdowns; but is that not just the fact, that electrical machinery becomes obsolete so soon—or at least that that has been past history—as it has been depreciated to a point where it was practically worthless long before worn out?

Mr. WOODWELL. That principle is true as applied to central-station service, where with the enormous growth of the service it has been necessary to supersede the apparatus long before it has been worn out; but in the Government buildings, where the original plant was installed, with sufficient reserve to take care of the service from year to year, that apparatus has served its purpose for a much longer time.

Mr. SMITH. But is it or not shown to be an economical one to operate as compared with new machinery?

Mr. WOODWELL. Generally speaking, modern machinery, of course, has improved the operating efficiency and economy materially, enough to warrant replacement.

Mr. SMITH. Take the time when we passed from the belt system to direct connection with the engine or dynamo, would not a wise business man have discarded, if it was any considerable sized plant, his old machinery, even though it was not worn out at all?

Mr. WOODWELL. Well, we have carefully investigated that matter, and I can give one concrete case, and that was in the post-office in Boston, where we had a belt equipment, and we thought it would be advantageous, in view of its worn-out and deteriorated condition, to discontinue its service. Subsequently a comparison of the operating expense showed that the old plant, though somewhat inefficient, to be sure, was not costing us very much more to operate in a year, and I might explain that by simply saying that it was due to the fact that we used the by-product or exhaust steam, getting full worth and

value for it during the heating season of the year, and it matters very little under such conditions what the economy of the plant is in steam consumption during the heating season.

Mr. SMITH. But during the heated season it would make a great deal of difference?

Mr. WOODWELL. It makes a great deal of difference during the heated or summer season.

Mr. SMITH. It makes a very considerable difference, you think?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. Now, fifteen years ago it was quite customary to use a continuous current for this purpose, was it not?

Mr. WOODWELL. Almost exclusively.

Mr. SMITH. And now it is the universal custom to use the alternating current?

Mr. WOODWELL. No, sir; practically all of our plants in Government buildings are generating direct current to-day, and will continue to do so, for good reasons, for some time to come.

Mr. SMITH. Could you tell us what the reasons were that made that system desirable for public buildings and for isolated plants and not ordinary plants?

Mr. WOODWELL. It is due to the fact that motors can be much more satisfactorily operated for elevators and other power purposes on a direct-current system than on an alternating-current system, which up to a very few years ago has not been successful in elevator service.

Mr. SMITH. Why is it not entirely feasible to change an alternating current into a direct current?

Mr. WOODWELL. It is; but it is done at approximately a loss of 10 per cent upon the current so converted.

Mr. SMITH. The alternating current for transmission purposes is much more desirable, is it?

Mr. WOODWELL. It is absolutely indispensable.

Mr. SMITH. To what distance can you transmit the direct current profitably?

Mr. WOODWELL. Only within a radius of about three-fourths of a mile from the station.

Mr. SMITH. Up to that distance you think it is as economical as the alternating current?

Mr. WOODWELL. That depends of course upon the condition of the loads and the hours of service, and other factors.

Mr. SMITH. Assuming the other factors to be substantially equal, what do you say as to the economy of supplying the Pension building with direct or alternating current from the site of the old Post-Office building?

Mr. WOODWELL. That matter was very carefully considered at the time of the installation of that plant, which was installed under my plans and specifications. It was found that a direct-current system was far more economical in that case than the alternating current could have been.

Mr. SMITH. If a general contract for current should be made with a commercial company, it would be an alternating current that would be furnished, would it not?

Mr. WOODWELL. Undoubtedly, for lighting purposes.

Mr. SMITH. Well, would it not be for all purposes, convertible into direct current at the building, of course?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. But the current furnished would be an alternating current?

Mr. WOODWELL. Presumably; I would not undertake to say positively as to that.

Mr. SMITH. Is there any doubt about that. That is all this commercial company could furnish, an alternating current, is it not?

Mr. WOODWELL. I should assume that.

Mr. SMITH. There is not much doubt about the assumption, is there?

Mr. WOODWELL. If the current is generated, for example, at the plant of the Potomac Company, at Bennings, it would be, of course, furnished with alternating-current service.

Mr. SMITH. It would be utterly impracticable to furnish anything else down here in town from out there, would it not?

Mr. WOODWELL. It would.

Mr. SMITH. What quarters are occupied by this electric plant in the Post-Office Department that would be vacated if that system was abandoned entirely?

Mr. WOODWELL. The space occupied in the basement is approximately 40 feet square, or about 1,600 square feet.

Mr. SMITH. Is that all that would be vacated?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. What is your experience as to the cost per kilowatt hour? Is it constantly increasing for an old plant?

Mr. WOODWELL. From experience we have succeeded in maintaining a very fair efficiency through the life of the plant by continued repairs.

Mr. SMITH. Do you think there is any diminution in efficiency?

Mr. WOODWELL. There is undoubtedly a diminution in efficiency.

Mr. SMITH. Annually and constant?

Mr. WOODWELL. It is more or less constant, but it can not be said that it is continually falling throughout the life of the plant. It falls more rapidly the first year.

Mr. SMITH. Is the diminution in efficiency due wholly to depreciation in the engine or also to the dynamo?

Mr. WOODWELL. It is due almost entirely to wear on the valves of the engine.

Mr. SMITH. You think there is no appreciable depreciation of efficiency in the dynamos themselves?

Mr. WOODWELL. None whatever, I should say, that could be taken account of.

Mr. SMITH. That is all I care to ask. So far as I am personally concerned as to anything I have in mind the examination as to the Post-Office Department is concluded, unless some of the other members of the committee desire to ask some questions. If not, I will ask Mr. Conrard one or two questions. Mr. Conrard, you buy some current for the other buildings that are occupied by the Post-Office Department, do you not?

Mr. CONRARD. Yes, sir; at the Annex building at First and K streets NE.

Mr. SMITH. That is the division of supplies, is it not?

Mr. CONRAD. That is the division of supplies, the mail bag repair shop, and several other divisions of the Department.

Mr. SMITH. You also rent a part of the Star building, do you not?

Mr. CONRAD. No, sir; we used to rent that, but it was vacated several years ago.

Mr. SMITH. You use no part of the Star building?

Mr. CONRAD. We have no rented buildings except those at First and K streets NE.

Mr. SMITH. And they are run with commercial current, are they not?

Mr. CONRAD. Yes, sir.

Mr. SMITH. What do you pay for that?

Mr. CONRAD. Six cents.

Mr. SHERLEY. Do you consider that 6-cent contract a proper contract?

Mr. CONRAD. I did not make the contract and I have not gone into the question. I do not know what the current prices are or should be.

Mr. SHERLEY. But if you are making a current at something under 3 cents for a kilowatt hour, do you think it is proper to pay 6 cents for it?

Mr. CONRAD. Well, I do not know; it was not a matter of choice. We have no plant in the building and have to get it from outside.

Mr. SHERLEY. Of course it may not be a matter of choice, but you would not consider that a very desirable contract, I suppose?

Mr. SHAW. No, sir; it was not considered at the time to be. The question was brought up and we tried to get the benefit of the Treasury Department contract of 4 cents, but the Potomac Electric Company's statement was that the Secretary of the Treasury was the chairman of the committee appointed by Congress to arrange those rates in Government buildings, and that the 6-cent rate must govern until that committee had made their report as to what the rate should finally be.

Mr. SHERLEY. What is the life of that contract?

Mr. SHAW. From year to year.

Mr. SHERLEY. How long has it been in existence?

Mr. SHAW. Since July 1.

Mr. SHERLEY. What was the beginning of it?

Mr. SHAW. July 1 last.

Mr. SHERLEY. You had no contract prior to that time?

Mr. SHAW. No, sir.

Mr. CONRAD. Those buildings were not occupied by the Post-Office Department prior to that time.

The CHAIRMAN. In estimating the depreciation what items of the equipment do you estimate it on; do you estimate anything on boilers for that?

Mr. WOODWELL. That includes the engine-room plant proper.

Mr. SMITH. You put in nothing then for depreciation of boilers?

Mr. WOODWELL. No, sir; for the reason that all of that boiler equipment would be necessitated in any event.

Mr. SMITH. Do you think that it would wear out just as fast with it as without it?

Mr. WOODWELL. I think it would make no difference with steam on it whether it was for the engine room or the heating system.

Mr. SMITH. Mr. Woodwell, you are the inspector of electric-light plants of the Treasury Department, are you not?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. What is the exact nature of your functions?

Mr. WOODWELL. Supervising the operation of the several electric-light plants installed in the Government buildings throughout the country, together with other technical duties relative to such work.

Mr. SMITH. Are you familiar with the ordinary prices paid to commercial companies by the Government throughout the country?

Mr. WOODWELL. Yes, sir; we are responsible for recommending the award of such contracts for the buildings in which we purchase current.

Mr. SMITH. What, generally speaking, is the range of prices of current per kilowatt hour through the country?

Mr. WOODWELL. From $2\frac{1}{4}$ cents, the rate in one or two extreme cases, to 20 cents per kilowatt hour.

Mr. SMITH. Where are the places that you speak of where the rate is $2\frac{1}{4}$ cents? Are they where water power is at hand for the production of current?

Mr. WOODWELL. In one case we had a contract with the Buffalo General Electric Company, using Niagara Falls power, at $2\frac{1}{2}$ cents. That, however, now has been increased to about 4 cents per kilowatt hour.

Mr. SMITH. The power is produced by Niagara Falls?

Mr. WOODWELL. They use that water power; yes, sir.

Mr. SMITH. Where is it that you have the $2\frac{1}{4}$ -cent rate now?

Mr. WOODWELL. We have a $2\frac{1}{4}$ -cent rate in Baltimore.

Mr. SMITH. Is that now the lowest rate of any place in the country?

Mr. WOODWELL. I was speaking from memory; I think there is one other place where we are purchasing current for less. I think it is a small city in Pennsylvania where, owing to the competition between rival companies, a cut rate was established.

Mr. SMITH. You think that was below $2\frac{1}{4}$ cents?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. But you do not know what it is?

Mr. WOODWELL. No, sir; I think it is approximately 2 cents.

Mr. SMITH. Have you any idea at all what the average rate in the country is for commercial current furnished the United States?

Mr. WOODWELL. It approximates $4\frac{1}{2}$ or 5 cents for the total amount of current purchased by the Treasury Department for its outlying buildings throughout the country, mainly small buildings.

Mr. SMITH. Small buildings are more expensive to light than large ones, are they not?

Mr. WOODWELL. They are—served from small plants in small towns. The service is light and rather small, corresponding more nearly to a residence or some business houses.

Mr. SMITH. And there is a higher charge made for a small building than a large one?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. How did you come to do this work for the Post-Office Department?

Mr. WOODWELL. I did it at the request of the chief clerk of the Treasury Department, and also of Mr. Conrard, the chief clerk of the Post-Office Department.

Mr. SMITH. Have you done this work for about all the buildings in Washington, or just this one?

Mr. WOODWELL. I am acquainted with the Post-Office plant, having had more or less to do with its installation, and having made the acceptance test of the engines at the factory where they were constructed, and having inspected the work from time to time and being in close touch with the operating cost. In the case of the plant of the Department of the Interior, I prepared the plans and specifications for it. I am also familiar with the plant at the Bureau of Engraving and Printing.

Mr. CONRAD. I would like to say, Mr. Smith, that not being an electrical engineer, and Mr. Shaw not being an electrical engineer, I wanted somebody to go through the whole plant with Mr. Shaw—who, of course, is familiar with the practical operation of the plant—and I asked the chief clerk of the Treasury Department to send me some man to do that, and he sent Mr. Woodwell.

Mr. SMITH. Of course, my only object in inquiring was to see if Mr. Woodwell had other information as to plants that would be of value to us. Do you find, Mr. Woodwell, that the prices of coal in the local market materially affect the actual selling price of current, from your experience?

Mr. WOODWELL. It can hardly be said to be a sufficient factor to materially modify the rates. I think it may be said that a great many other factors are of greater importance than the cost of fuel.

Mr. SHERLEY. What other factors, for instance?

Mr. WOODWELL. The cost of land, as indicated in the case of a generating station in New York City, where they are compelled to put their boilers on three or four floors, not having sufficient ground area at reasonable rates. The distance from the station to the centers of distribution is another important factor, influencing largely the cost of distribution, and the cost of copper from the plant to the District; and local conditions of labor; character of electrical load, etc.

Mr. SHERLEY. What percentage of the cost of labor usually figures in a plant of some size?

Mr. WOODWELL. Labor and administrative salaries are often from 30 to 40 per cent of the cost of production at the switchboard of the power house, and right there I might say that the cost of production is generally less than one-half of the total cost of delivery of current to the consumer—that is to say, the cost of distribution in very many of the larger cities is found to about equal the cost of production at the switchboard.

Mr. SHERLEY. Then, in the statement prepared here, of course, the cost of distribution is included?

Mr. WOODWELL. But, you see, that was practically nil. The plant is in the building which serves the switchboard, within a few feet of the dynamos, and that entire cost is eliminated. That explains in part why the Government, in its small and apparently inefficient plant, can compete with the service furnished by a large company, because the company has to stand the expense of distribution, including maintenance, repairs, and deterioration on the connecting lines and other connecting links, such as transforming machinery, etc.

Mr. SMITH. With the modern improvements in electrical apparatus, would the loss in transmission from as far as this Benning station amount to anything?

Mr. WOODWELL. It would be a material factor, especially in the conversion of the alternating current to direct current.

Mr. SMITH. And that, I believe you said, would be about 10 per cent alone?

Mr. WOODWELL. That alone would be at least 10 per cent.

Mr. SMITH. What would possibly be the loss in transmission, aside from that, from as far out as this Benning plant?

Mr. WOODWELL. Three or 4 per cent.

Mr. SMITH. Three or 4 per cent additional?

Mr. WOODWELL. Yes, sir.

Mr. SMITH. I think that is all, gentlemen.

Mr. CONRARD. In connection with the matter of the power and lighting I desire to submit this statement, which shows the failures of the current in the annex buildings since our occupancy of the building last July.

Mr. SMITH. That is the division of supplies building?

Mr. CONRARD. Yes, sir.

Mr. SMITH. You may hand that to the reporter and have him incorporate that in the record.

Since the Post-Office Department has occupied what are known as the Annex buildings (July 1, 1907), at First and K streets NE., Washington, D. C., the electric current, which is furnished by the Potomac Electric Power Company, has failed as follows:

Two hundred and twenty volt current for operating machines in the mail bag and mail lock repair shops:

September 6, 1907, five hours and thirty minutes.

September 17, 1907, five minutes.

October 3, 1907, one hour and twenty minutes.

October 10, 1907, one hour.

November 8, 1907, one hour and forty-five minutes.

January 7, 1908, forty minutes.

January 22, 1908, forty minutes.

Five hundred and fifty volt current for operating the elevators:

September 8, 1907, two hours.

September 13, 1907, one hour.

October 1, 1907, two hours and thirty minutes.

October 15, 1907, three hours and fifteen minutes.

October 18, 1907, three hours.

November 16, 1907, three hours.

December 4, 1907, two hours.

December 23, 1907, ten hours.

January 15, 1908, three hours and fifteen minutes.

January 17, 1908, two hours.

March 17, 1908, six hours.

In addition to the cases cited above, the current has failed on numerous occasions for a few minutes, of which no record has been kept.

Mr. CONRARD. I might add that in connection with our own plant we have had but one failure, and that was only a partial one, which lasted about a half hour, did it not, Mr. Shaw?

Mr. SHAW. Eighteen minutes.

Mr. SMITH. That is all, gentlemen.

NAVY-YARD, WASHINGTON, DISTRICT OF COLUMBIA.

STATEMENT OF H. T. MORNINGSTAR, ELECTRICAL ENGINEER.

Mr. SMITH. You have furnished, have you not, Mr. Morningstar, some tabulated statements of the cost of production of electrical current at the navy-yard.

Mr. MORNINGSTAR. I have; yes, sir. Some man came down there to see me one day and wanted to know how much we could turn the current out for, and I told him.

Mr. SMITH. You gave him a typewritten statement?

Mr. MORNINGSTAR. I gave him a copy of something that I had. He asked me if I had it and I told him yes.

Mr. SMITH. Who was that?

Mr. MORNINGSTAR. I do not know who he was, whether he was a newspaper man or not. I was in a hurry at the time, and the admiral was with me, and I just handed it to him.

Mr. SMITH. What is the character of the plant at the navy-yard? Do you produce any heat whatever?

Mr. MORNINGSTAR. We produce heat, light, and power.

Mr. SMITH. What do you use heat for there?

Mr. MORNINGSTAR. We use it for heating up the machine shops, drafting rooms, officers' quarters, and in the general storehouse for keeping materials dry, and in the pattern shops.

Mr. SMITH. You have some refrigerating work to do there, do you not?

Mr. MORNINGSTAR. No, sir; we have nothing of that kind to do.

Mr. SMITH. What is your method of chilling the material in which you insert the guns before putting the outer cases on them?

Mr. MORNINGSTAR. Do I understand you, in the shrinking pit of the gun shop, you want to know how the shrinking is caused after the jackets have been expanded?

Mr. SMITH. I want to know how the water is chilled—it is water, is it not, in the shrinking pit?

Mr. MORNINGSTAR. Yes, sir; we use city water.

Mr. SMITH. How is it chilled?

Mr. MORNINGSTAR. We do not chill it; we use it just as it comes from the hydrant.

Mr. SMITH. I thought that was reduced to a very low temperature.

Mr. MORNINGSTAR. Not to my knowledge. I have nothing to do with the shrinking pit.

Mr. SMITH. What I was trying to ascertain was whether there was any refrigeration in connection with the pit.

Mr. MORNINGSTAR. No, sir.

Mr. SMITH. About what percentage of the current out there is for light and what is for power?

Mr. MORNINGSTAR. I would say roughly—I have the reports in the next room—about 10 to 12½ per cent for light.

Mr. SMITH. And the balance is for power?

Mr. MORNINGSTAR. All machinery is operated by electric power.

Mr. SMITH. What is the extent of the heating required there, in the sense; I presume you have a system by which you use exhaust steam for heating purposes, do you not?

Mr. MORNINGSTAR. No, sir; we have a direct system; we have 20 boilers in our boiler house—five that send the steam to the electric plant and the remainder that send the steam to the officers' quarters or any buildings that may require it, such as air compressors and trip hammers in forge shop and rolling mill in cartridge-case shop.

Mr. SMITH. So you have no utilization for exhaust steam at all?

Mr. MORNINGSTAR. No, sir

Mr. SMITH. It is recondensed, is it?

Mr. MORNINGSTAR. No, sir.

Mr. SMITH. Is it thrown away?

Mr. MORNINGSTAR. The engines will operate condensing at all times. The exhaust steam from the engines, however, exhaust into a Bulkley jet condenser, meeting a spray of water, which condenses the steam—that is, kills it, producing a vacuum which varies from 26 to 27½ units. The process causes the water to be heated to a temperature somewhere around 100°. This water can be returned to the boilers, so we can not exactly say that the exhaust steam is wasted, in that it is used to heat the water before it goes to the boilers. Should the exhaust steam be used for heating it would cause a back pressure, decreasing the efficiency of the units 50 per cent. Again, the exhaust of these engines would not be sufficient to heat any of the buildings in the navy-yard, except, possibly, two or three within the immediate vicinity of the engine room.

Mr. SMITH. You are furnished water free there, are you not?

Mr. MORNINGSTAR. For the engines—for our condensers?

Mr. SMITH. Yes.

Mr. MORNINGSTAR. We do not use the city water; we pump our own water from the river. We have a pit in the power plant that is about 20 or 30 feet wide, and the water flows in that by gravity, and there are three pumps that drive the water up to those condensers. We do not use any water except in the shrinking pit for use after the jackets have been expanded.

Mr. SMITH. You are able, then, to tell exactly, if you go about it properly, the quantity of steam that you use for heat and the quantity you use for power and light?

Mr. MORNINGSTAR. We can tell by our log books, which we have down there during the winter time. I have not got them with me here; but we put two to three boilers on the heating, 300 horsepower each, and generally about two of those boilers will furnish the heat for the office buildings and all shops and officers' quarters.

Mr. SMITH. How do you arrange about the firemen for those boilers that are only used in the winter?

Mr. MORNINGSTAR. We generally dispense with several firemen in the summer time. We have automatic stokers, the Wilkinson stokers, that fire them automatically, and we have a few engineers who watch the pumps and motors, which do this automatic firing.

Mr. SMITH. It requires some firemen even with automatic stokers, does it not?

Mr. MORNINGSTAR. We keep a few men there to see that the coal-handling machinery and hoppers are working all right, but very few firemen.

Mr. SMITH. How do you charge them in computing the cost of this electric current?

Mr. MORNINGSTAR. Well, I would simply figure the cost of the boilers that are on the power plant; for instance, on a day like to-day we would be running two of those large engines down there, about a thousand horsepower each, with five boilers on them, and then we would figure, taking the five boilers for eight hours. The load decreases after 4 o'clock in the afternoon until midnight, and then we figure how many boilers are on them and firemen. Then from mid-

night until 8 in the morning—we run three shifts down there; now we have only two shifts. There are very few men who work from midnight until morning on account of lack of funds; consequently, one engine will run the load from midnight until 8 in the morning.

Mr. SMITH. Have you a wattmeter there?

Mr. MORNINGSTAR. Yes, sir; then we set down the amperes and volts hourly and the consumption on the ammeters and compare it with the wattmeter.

Mr. SMITH. The method of comparison is what?

Mr. MORNINGSTAR. We have the ammeters and set down each hour the number of amperes consumed, which tallies with the wattmeter.

The CHAIRMAN. But that does not explain it directly; just explain the exact method of comparison of the two systems.

Mr. MORNINGSTAR. We would add up the total amperes and multiply it by the volts, which would give us the watts.

Mr. SMITH. And divide that by a thousand?

Mr. MORNINGSTAR. Yes, sir; to give the kilowatts and compare them to our recording wattmeter, which always tallies.

Mr. SMITH. What is your experience as to the accuracy of that comparison?

Mr. MORNINGSTAR. Well, that is hard to state; we know that the wattmeter is all right because it has been tested; it is frequently tested by the Bureau of Standards. Now, we set down in the log book every hour of the day what the condition is. We can tell by the ammeters jumping up whether a big crane is picking a gun, and the engineer will look at it and say 400 amperes, and on going to the next he would find that it had jumped to a thousand. So that in adding up the sum total we might have a little difference between the recording instruments and the ammeters, as the load is never constant it varies, and sometimes we don't get the correct statement by hourly readings but the recording ammeter gets it correct.

Mr. SMITH. That may be true, but I am asking you now whether as a matter of fact the product of the amperes and the volts divided by a thousand, usually closely correspond with the kilowatt hours indicated by the wattmeter?

Mr. MORNINGSTAR. Generally very closely; yes, sir.

Mr. SMITH. So that even without a wattmeter you think with simply a record of the amperes and volts you could make a fairly accurate estimate?

Mr. MORNINGSTAR. No, sir; I do not. I think for the lighting you could, but for the power you could not. For light the load is constant, but for power it is not, it is fluctuating.

Mr. SMITH. In a plant where they had no wattmeter you think the other system would be fairly accurate?

Mr. MORNINGSTAR. Well, provided they set those readings down.

Mr. SMITH. If the people were accurate you think the system would be?

Mr. MORNINGSTAR. Yes, sir.

Mr. SMITH. Now, the statement that you have furnished is in the record. Have you any further suggestions to make about that?

Mr. MORNINGSTAR. I have a copy of it here. In the bottom statement, where it says "depreciation of boiler and engine plants," it

states a certain amount for "general repairs to both." That should have read "in addition to the depreciation in boiler and engine and repairs and interest on money invested."

Mr. SMITH. At what do you compute the interest on money invested?

Mr. MORNINGSTAR. We generally assume 6 per cent interest on the money invested.

Mr. SMITH. You generally do, but do you in this statement?

Mr. MORNINGSTAR. Yes, sir; that is taken into account here. We are a little bit ahead. I figure roughly 20 per cent.

Mr. SMITH. For depreciation and maintenance?

Mr. MORNINGSTAR. Maintenance and interest on money invested, but here it would appear as though 10 per cent of it were for depreciation and 10 per cent for maintenance when really it should have been itemized at about 6 per cent for depreciation and 6 per cent for maintenance and 6 per cent interest, in all, 18 per cent. We are about 2 per cent off here of what it actually would be. I merely did that so that I would be on the safe side so that nobody could come back at me. I added that on as 6 per cent for interest.

Mr. SMITH. In computing depreciation you set apart these boilers that are used for current—

Mr. MORNINGSTAR. No, sir; I figured on the entire installation, the whole boiler house, notwithstanding some are used to operate steam-driven air compressors, steam-driven trip hammers, and for heating.

Mr. SMITH. Did you count it upon the building?

Mr. MORNINGSTAR. The building and everything—the erecting of the building, and all appurtenances and accessories, not the power house and boiler house, labor, etc.

Mr. SMITH. How are you able to explain the production of this current so much below what it is produced for anywhere else that we have been able to get a record of?

Mr. MORNINGSTAR. I understand you to mean have produced it—I do not understand you to say, how do I produce it cheaper?

Mr. SMITH. If you make it, it is produced, and it is cheaper than anything that we have been able to get a trace of up to date.

Mr. MORNINGSTAR. The larger the prime mover the greater the efficiency.

Mr. SMITH. It is the largest governmental plant in Washington, is it not?

Mr. MORNINGSTAR. It is the largest plant in Washington—that is governmental plant—and the second largest in the city. It is second to the Bennings power station.

Mr. SMITH. How does it compare with other Government navy-yard plants, if you know?

Mr. MORNINGSTAR. It is about on the same footing. I understand from the Navy Department that the cost of production of current per kilowatt hour at other yards runs about seventy-five one hundredths per cent.

Mr. SMITH. You do so understand, outside of Washington?

Mr. MORNINGSTAR. Outside of Washington, at the various other navy-yards.

Mr. SMITH. I have advices from the War Department that the War Department plant runs at from 3 to 10 cents—the quartermaster's electric plant?

Mr. MORNINGSTAR. Have you the figures to show that?

Mr. SMITH. I have the figures from the War Department; it is from 3 to 11 cents, varying according to the size of the plant.

Mr. MORNINGSTAR. This is in the War, State, and Navy building plant?

Mr. SMITH. No; I am not talking about the War Department building, but the different yards over the country under the charge of the quartermasters.

Mr. MORNINGSTAR. I do not quite understand that. Briefly speaking, though, it must be bad management or else that their coal costs excessively, and that the plant is comparatively small. The larger the plant the more economically the current can be produced. Our plant is a very large power plant and our coal delivered to the navy-yard is about \$2.65 per ton, and the cost of production is about 1.1 cents per ton. The cost of production of current is about 0.8 cent per kilowatt hour, including the expenditures, maintenance, depreciation, interest on money invested, etc.

Mr. SMITH. Did you put your salary in this estimate?

Mr. MORNINGSTAR. No, sir; because my salary is so small that I hated to put it in. My salary is \$1,400 a year, where it should be about \$2,500. The reason I did not figure in my salary was because in the event they should purchase a current from the outside they still would have to have one chief electrician, or electrical engineer, to look after and test 1,700 motors and the extensive underground conduit system, and fire alarms and telephones, storage batteries, electric clocks, and other things that would give more trouble than the big things.

Mr. SMITH. How many assistants have you?

Mr. MORNINGSTAR. I have in all about 35 men under me.

Mr. SMITH. I mean assistant electricians?

Mr. MORNINGSTAR. I have not any; there is just one. The appropriation bill reads, "One electrician." There is no assistant electrician, but I have a number of engineers and machinists and wiremen and armature men, cable splicers, and the like, which we would still have to have in the event we bought the current from the outside.

Mr. SMITH. Have you there the statements that you refer to?

Mr. MORNINGSTAR. I have here two statements; one is the cost of producing current, as our load actually is. Now, that is 16,169 kilowatt hours in twenty-four hours. This was gotten up in May when the officers wanted to determine how much to charge them for the current furnished to the quarters. The other is based on an estimate of the maximum output of the plant; that is to say, in running five of those engines instead of four.

Mr. SMITH. What was the statement that you furnished to those Members of Congress and others; was it on the basis of the full capacity, the actual production?

Mr. MORNINGSTAR. I furnished two, one was as it actually is, and the other is as I could carry it, etc.

Mr. SMITH. Will you hand that to the reporter and have it incorporated in the record?

Mr. MORNINGSTAR. Certainly. Where that reads "depreciation," it includes interest on money invested, as I have said.

UNITED STATES NAVY-YARD,
Washington, D. C., May 2, 1908.

The following is an itemized statement showing the cost per kilowatt hour of producing electric current in the navy-yard, Washington, D. C., the plant running at its maximum capacity:

Coal consumed under 10 boilers, 63 tons.....	\$163.80
Pay of 12 engineers, 3 shifts of 8 hours.....	43.44
Pay of two laborers.....	3.84
Attendance on boilers, 6 men, 8 hours each.....	13.44
Lubricating oil.....	.88
Cylinder oil.....	1.36
Grease.....	.10
Waste.....	.60
Boiler compound.....	.50
Depreciation of boiler and engine plants, and general repairs to both, and interest.....	371.75
Total daily cost.....	599.71
Maximum output of each of four large generating units.....amperes..	2,500
Maximum output of one smaller generating unit.....do.....	2,250
Maximum output of one small unit.....do.....	500
Total maximum output of six units.....do.....	12,750
Total kilowatts per hour (230 volts).....	2,932.5
Total maximum kilowatt hour capacity for one day of 24 hours.....	70,380
Cost to produce current, per kilowatt hour.....	\$0.008521

UNITED STATES NAVY-YARD,
Washington, D. C., May 15, 1907.

(Memorandum for Commander Sharp, United States Navy.)

In compliance with your request for information concerning the cost of producing electric current per kilowatt hour, I have to report as follows:

Coal consumed under 2 boilers for 8 hours and 4 boilers for 16 hours, 70,650 pounds, or 31.5 tons, at \$2.60 per ton.....	\$81.90
2 engineers, 12 to 8 shift; one at \$3.76 and one at \$3.52 per diem.....	7.28
4 engineers, 8 to 4 shift; two at \$3.76, 1 at \$3.28, and 1 at \$4 per diem.....	14.80
2 engineers, 4 to 12 shift; one at \$3.76 and one at \$3.28 per diem.....	7.04
3 men, 8 hours each, attending boilers, \$2.24.....	6.72
2 laborers, \$1.92 per diem.....	3.84
Lubricating oil.....	.44
Cylinder oil.....	.68
Grease.....	.05
Waste.....	.30
Boiler compound.....	.25

Total daily cost of output..... 123.30

Number of kilowatt hours produced daily, 16,169, approximately, $123.30 \div 16,169 = 0.00762$.

Cost of current per kilowatt hour.....	\$0.00762
Add depreciation of machinery.....	.00014

Net cost of producing current per kilowatt hour..... .00776

Mr. SMITH. Now, this one, dated May 2, is the actual production, is it, at the present time, or approximately so?

Mr. MORNINGSTAR. The actual production. The average load runs about 16,000.

Mr. SMITH. That is shown on the statement under date of May 15?

Mr. MORNINGSTAR. Yes, sir. Some days it is higher and some days it is lower, but that is a fair average.

Mr. SMITH. You have not furnished, now, to anybody a gross statement of the annual cost, have you?

Mr. MORNINGSTAR. Of operating our plant?

Mr. SMITH. Yes.

Mr. MORNINGSTAR. I did this morning, in the Admiral's office. Representative Dawson was there.

Mr. SMITH. But you did not give him any copy of that?

Mr. MORNINGSTAR. Of these?

Mr. SMITH. No; of the one showing the actual gross annual cost of operating your electric plant.

Mr. MORNINGSTAR. No, sir; I did not give him anything.

Mr. SMITH. You verified one that he brought there with him, did you?

Mr. MORNINGSTAR. Yes, sir; one that he had brought along that he had gotten from Mr. Cary, I presume.

Mr. SMITH. Have you a daily record of the actual number of kilowatt hours of the current produced?

Mr. MORNINGSTAR. Yes, sir; I have that right in the next room.

Mr. SMITH. I wish you would answer what has been the gross number of kilowatt hours produced in the last year, or in some such period as that, and the exact gross cost for the same period.

Mr. MORNINGSTAR. You mean, say, for instance, from January 1, 1907, to January 1, 1908?

Mr. SMITH. Yes; the gross annual expenditures on account of your plant and the gross number of kilowatt hours.

Mr. MORNINGSTAR. The expenditures would include any requisitions that we submitted, or anything like that.

Mr. SMITH. Anything connected with this electric plant.

Mr. MORNINGSTAR. That I can not do; I am not prepared to give that. I can state briefly that the consumption of the current would be in the neighborhood of between five and six million kilowatt hours in a year.

Mr. SMITH. The reason I ask the question is because you spoke here of the maximum output of each of the four units, etc. Now, I want to know, not what the maximum is, but what has been the actual production.

Mr. MORNINGSTAR. Between five and six million kilowatt hours.

Mr. SMITH. I wish you would furnish us, to be incorporated with your statement, the exact number of kilowatt hours for the last calendar year, and also the full expenditures for that period.

Mr. MORNINGSTAR. That I would have to get from our monthly reports.

Mr. SMITH. We would be glad to have you put that in your statement, the gross expenditures of this plant for the last calendar year and also the gross product in kilowatt hours.

Mr. MORNINGSTAR. It runs about \$123 a day, I think the memorandum says.

Mr. SMITH. But this seems to be in part based upon an assumption of the maximum capacity.

Mr. MORNINGSTAR. One is the actual conditions—the memorandum to Commander Sharp—whichever one you have in your hand. There is one addressed to Commander Sharp.

Mr. SMITH. That is supposed to be the actual conditions at that identical time?

Mr. MORNINGSTAR. That is as it is right now.

Mr. SMITH. Now, if you will give us for our use this other matter as soon as possible we will be obliged to you, because I think that is the fairest test after all—that is, what was the production during the last calendar year in kilowatt hours and what was the gross expenditures.

Mr. MORNINGSTAR. Including all requisitions?

Mr. SMITH. Including everything except, perhaps, your salary. That would have to go on anyhow.

Mr. MORNINGSTAR. I figured in everybody's salary except mine—the firemen and engineers and all.

Mr. SMITH. If you will do that, that is all I care to ask you.

Mr. Morningstar subsequently submitted the following:

Statement showing cost to produce electric current per kilowatt hour in the Washington Navy-Yard.

Labor, oils, waste, etc., used in operating engines.....	\$13, 151. 39
Repairs to boilers and accessories.....	3, 114. 78
Labor to operate boilers.....	5, 310. 44
Repairs to engines and generators.....	1, 665. 90
Coal, including handling.....	19, 830. 07
	<hr/>
	43, 072. 58

Actual consumption of current, as set down hourly during year ended March 31, 1908, 4,966,876 kilowatt hours.

Quotient, \$0.008672, equals cost per kilowatt hour of production.

BUREAU OF ENGRAVING AND PRINTING.

STATEMENT OF R. H. CHAPPELL, CHIEF OF ENGINEERING AND MACHINE DIVISION.

Mr. SMITH. What is the nature of your plant at the Bureau of Engraving and Printing as to being a combined heating, electric power, and light plant?

Mr. CHAPPELL. The plant is combined in a sense and in a sense it is separated, because we have high-pressure boilers used for generating current alone and low-pressure boilers used for running pumps and furnishing steam for miscellaneous purposes throughout the Bureau.

Mr. SMITH. So that you do not use your exhaust steam from your high-pressure boilers for heating purposes?

Mr. CHAPPELL. We use exhaust steam entirely for heating purposes, except at certain times when the exhaust steam from the engines is not sufficient.

Mr. SMITH. So that, if I understand you now, you use your high-pressure boilers for current and then use the exhaust steam from them for heating purposes?

Mr. CHAPPELL. Yes, sir.

Mr. SMITH. And then you have low-pressure boilers for heating purposes?

Mr. CHAPPELL. We only use those for heating purposes when the supply of steam from the engines is not sufficient.

Mr. SMITH. How do you, then, separate the cost of producing current from the cost of producing heat in the statement that you have made?

Mr. CHAPPELL. I do not think I have stated it quite in that way. The statement I have made of the cost of producing current is the extra expense we would be put to if we were forced to shut down our plant, which, you might say, would be the same thing.

Mr. SMITH. What I want to get at is how you estimate it—what you allot for the electric current. In other words, what is your basis?

Mr. CHAPPELL. That is estimated from the cost sheets for the first nine months of the fiscal year. In other words, it is an estimate for twelve months based on our actual cost for nine months.

Mr. SMITH. But how do you separate it in your estimate; what would be fairly allotted to other uses and what to electric current?

Mr. CHAPPELL. Our cost sheets are made up by work slips from our employees of the Bureau. If they are working on high-pressure boilers or generators, that I charge to the power plant; if they are working on low-pressure boilers it is charged to low-pressure boilers and given separately.

Mr. SMITH. But part of this high-pressure boiler work is given for heat, as I understand it. I am trying to find out the coal you have used in reaching the cost of your electric current?

Mr. WOODWELL. I think I can make a statement as to that, Mr. Chairman, if you will permit me. As I understand it, a test was made which formed the basis of an estimated allowance of about 1,800 tons of coal, which would be required for the heating, to replace the steam which is now served from the engines through the exhaust; that is to say, by actual test for a period of time it was determined that about 1,800 tons a year would be required to supply the exhaust steam from the electric plant as a by-product, and therefore the difference between that and the total consumption of the power plant—the high-pressure service—would be chargeable to the generation of electric current, and that is the way I understand that figure is arrived at.

Mr. CHAPPELL. That is correct.

Mr. SMITH. Now, by your system, what do you estimate the current costs you per kilowatt hour?

Mr. CHAPPELL. I should say about a cent and a half, that is, if we were to take in all the items that should go in there; depreciation and interest on the property, interest on the building, value of the space we occupy, etc., which has not been figured in. It is only an estimate, but the figures are close as we can get to what it would cost us—that is, a figure that must be met by an outside company to make it a paying proposition for us to—

Mr. SMITH. That is, make it an even proposition?

Mr. CHAPPELL. Make it an even proposition; they have to meet that figure in order to make it a paying proposition.

Mr. SMITH. I do not understand you. If they made this proposition, you think there would be no profit in it to them?

Mr. CHAPPELL. No; there would be no profit in it to us if they made that proposition.

Mr. SMITH. Your idea is that (you have put the current in here at just such a price as if you bought commercial current and paid that price for it) your total expenses would be just the same as now?

Mr. CHAPPELL. Yes, sir; here is the statement with regard to that.

The CHAIRMAN. That may be inserted in the record.

The paper is as follows:

MEMORANDUM OF COST OF PRODUCTION OF ELECTRIC CURRENT FOR LIGHTING AND POWER PURPOSES, ETC., AT THE BUREAU OF ENGRAVING AND PRINTING.

The following report is based upon the records of cost of labor, fuel, supplies, repairs, etc., for the first nine months of the present fiscal year, kept in the office of the chief of the engineering and machine division, Bureau of Engraving and Printing:

TABLE 1.—*Showing the total cost of producing light, heat, power, and steam for various purposes about the Bureau, and including depreciation on the entire plant.*

Cost to generate and heat, including depreciation:	
Depreciation (6 per cent of \$104,000).....	\$6, 240. 00
Coal (based on nine months' consumption, 7,853 + tons).....	27, 880. 08
Labor.....	18, 924. 12
Supplies.....	1, 667. 64
Repairs.....	2, 004. 36
	<hr/>
	56, 716. 20

TABLE 2.—*Showing the total cost of purchasing central-station service and producing steam for heating, and various other purposes about the Bureau, and including depreciation on the entire plant.*

Heating and central-station service, including depreciation on present plant:	
Cost of current—	
One-seventh of 1,319,604 kilowatt hours, at \$0.06.....	} \$39, 588. 12
Six-sevenths of 1,319,604 kilowatt hours, at \$0.025.....	
Depreciation (6 per cent of \$104,000).....	6, 240. 00
Coal (7,853 + tons — 1,752 tons, at \$3.55).....	21, 660. 48
Labor (Table 1—Table 3).....	12, 588. 62
Supplies (Table 1—Table 3).....	472. 62
Repairs (Table 1—Table 3).....	881. 16
	<hr/>
	81, 431. 00

TABLE 3.—*Shows the cost of generating light and power only, and includes depreciation on the generating plant only.*

Cost of generation only, including depreciation:	
Depreciation on generating plant (6 per cent of \$66,731.11).....	\$4, 003. 87
Coal (1,752 tons, at \$3.55).....	6, 219. 60
Labor $\frac{1}{2}$ of 4 firemen, at \$850.....	\$1, 700. 00
$\frac{1}{2}$ chief engineer, at \$1,600.....	400. 00
$\frac{1}{2}$ 4 assistant engineers.....	687. 50
3 dynamo tenders.....	3, 000. 00
1 wiper.....	548. 00
	<hr/>
	6, 335. 50
Supplies for engineer (Table 1—Table 2).....	1, 195. 02
Repairs (Table 1—Table 2).....	1, 123. 20
	<hr/>
	18, 877. 19

From the above tables it is evident that the cost of purchase of electric current from the Potomac Electric Power Company under the most favorable condition, added to cost of operating the steam plant remaining in the event of the abandonment of the isolated electric plant, would exceed the present total cost of operation by an amount of \$81,431—\$56,716.20, or \$24,714.80.

The estimated kilowatt hour consumption for the present fiscal year being 1,319,604, it will be seen that the cost of production of electric current (including depreciation on the generating plant) is $\frac{\$18,877.19}{1,319,604} = \0.0143 per kilowatt hour.

Even if the theoretical cost of the proportionate expense for administrative and office expenses, together with an annual charge to cover depreciation on the power

plant, building, and value of ground occupied thereby, were added to the above figures, the cost of production would not exceed $1\frac{1}{2}$ cents per kilowatt hour.

If the operation of the electric plant at the Bureau were discontinued, the depreciation would remain the same and the Potomac Company should furnish electric current for a cost less than $\frac{\$18,877.19 - \$4,003.87}{1,319,604}$ or \$0.0112 per kilowatt hour to make it an object to purchase such current.

There is every indication that the cost of production of electric current for the ensuing fiscal year will be less than that above quoted.

Mr. CHAPPELL. It is less than a cent and a half. I have not included in that statement the rent of the property, which is problematical; I do not know how much that property is worth a square foot, and I do not know that anybody does. The Government has owned the property a good many years, and it is probably worth more now than when the Government bought it, but I do not know how much it is worth. It will be a pretty hard matter to tell how much of that building to charge to the generating plant, because the upper story, over the engines, is occupied by another division (the ink-making division), so we could not include the roof of the building; it is a guess, so I have left it out.

Mr. SMITH. You have put in 6 per cent for depreciation?

Mr. CHAPPELL. Yes, sir; and interest.

Mr. SMITH. Is that 6 per cent computed not only upon the electrical machinery but upon the boilers?

Mr. CHAPPELL. Yes, sir; the depreciation in Tables 1 and 2 includes everything—boilers, conveying apparatus, pumps, switchboards, generators, engines, and everything that goes to make up both high and low pressure plants.

Mr. SMITH. You do not get a separate appropriation, I believe, for heat and light, do you?

Mr. CHAPPELL. I do not know anything about that; I do not know how that is. That is all paid for out of the Bureau appropriation, but whether there are two appropriations or one I do not know.

Mr. SMITH. This exhibit that you have just handed in is a memorandum that you have made and it as near as you can approximate it, the approximate cost of this current?

Mr. CHAPPELL. Yes, sir; all the items that you see in there are based upon an estimate for twelve months made from an actual nine months' run in this fiscal year; in other words, our actual run from the cost sheets to the 1st of April extended over twelve months. Of course, our cost is less than that during the summer months. I am cheating myself a little there, because in the summer months it ought to run a little less than that.

Mr. SMITH. I notice that you say:

If the operation of the electric plant at the Bureau were discontinued the depreciation would remain the same, and the Potomac Company should furnish electric current for a cost less than $\frac{\$18,877.19 - \$4,003.87}{1,319,604}$ or \$0.0112 per kilowatt hour to make it an object to purchase such current.

Mr. CHAPPELL. Yes, sir.

Mr. SMITH. That is hardly a justifiable assumption, that the depreciation would remain the same, is it?

Mr. CHAPPELL. I do not see why it is not; certainly we would have to junk the plant, and if we did we would be a loser there. We would

not make any repairs on it if it was shut down, which we are doing now. It depreciates faster if it is shut down than if it is in operation.

Mr. SMITH. If it were shut down it would not depreciate, would it?

Mr. CHAPPELL. Yes, sir. I do not know who we would sell it to; we would have to almost give it away. It would take a whole lot of depreciation to make up that \$66,000.

Mr. FITZGERALD. Do you think these plants are useless when any particular person finishes with them?

Mr. CHAPPELL. I am only basing my judgment on what we have received for one or two plants that we have sold.

Mr. SMITH. Have you a wattmeter down there?

Mr. CHAPPELL. Yes, sir; two or three of them.

Mr. SMITH. You say in this memorandum, "The estimated kilowatt-hour consumption for the present fiscal year"; that simply means that you have added one-third to nine months' actual consumption?

Mr. CHAPPELL. Yes, sir.

Mr. SMITH. That is absolutely correct as to the nine months and a one-third added?

Mr. CHAPPELL. Yes, sir.

Mr. SMITH. Gentlemen, I have an engagement at 5 o'clock, and as I do not desire to ask any further questions, I will excuse myself. As far as I am personally concerned, that concludes the examination.

Mr. GRAFF. How does this plant compare in size with the other Government plants in the city?

Mr. CHAPPELL. I do not know much about the other Government plants in the city, having been in the city only a year and not having had a chance to go around and see them. Perhaps Mr. Woodwell can tell you.

Mr. WOODWELL. They (the Bureau) have a total capacity of 800 kilowatts, or 1,200 horsepower. At the Post-Office they have 600 kilowatts, and at the Interior Department they have 325 kilowatts.

Mr. SMITH. How about the Government Printing Office?

Mr. CHAPPELL. I am not acquainted with the capacity of the plant at the Government Printing Office.

Mr. SMITH. What would be your judgment as to the relative size of the plant at the Government Printing Office compared with the plant at the Bureau of Engraving and Printing?

Mr. WOODWELL. The one at the Government Printing Office, I think, is somewhat larger.

Mr. SMITH. It is probably the second, is it not, in the city?

Mr. WOODWELL. I think so. I think the navy-yard is the largest and the Government Printing Office is second, etc.

Mr. FITZGERALD. How do you fix this per cent as the percentage of depreciation?

Mr. CHAPPELL. That includes the interest; it would not depreciate that fast, because we keep up repairs. We undertake to keep the plant in good order, so that the depreciation would not run as high as that; but 6 per cent is the depreciation which practically all engineers figure on ordinary plants.

Mr. FITZGERALD. We have had several witnesses here who testified that they charged 10 per cent depreciation.

Mr. CHAPPELL. Well, they are wrong. I do not believe there is a plant in this town that depreciates that fast.

Mr. GRAFF. Is interest computed in this estimate on the investment?

Mr. CHAPPELL. The interest is computed at about 2 per cent; yes, sir.

Mr. FITZGERALD. How long has that plant there been installed?

Mr. CHAPPELL. About five years, I think.

Mr. FITZGERALD. You think if it was discontinued it would probably be sold for junk?

Mr. CHAPPELL. Yes, sir; although we make repairs on it all the time.

Mr. FITZGERALD. I know, but at the end of five years, if discontinued, you sell it at practically no value?

Mr. CHAPPELL. It would depend on whether the man who wanted it happened along just at that time.

Mr. FITZGERALD. But you said, basing your judgment on experience that has been had in the sale of other plants, the price paid is practically that of old junk?

Mr. CHAPPELL. Yes, sir; it is very small.

Mr. FITZGERALD. Do you not think that your estimate as to depreciation is large?

Mr. CHAPPELL. That plant that I have reference to as having been sold was in operation seventeen years.

Mr. FITZGERALD. You are speaking of this particular plant if closed down and disposed of?

Mr. CHAPPELL. You can not figure it that way. Suppose you should close it down within two years after you had put it in? If a man who wanted to use it did not happen along at that time you could not sell it for anything except junk.

Mr. GRAFF. Does not the matter of depreciation relate to the difficulty of selling a secondhand plant?

Mr. CHAPPELL. Yes, sir; if you own an automobile that you have bought to-day and try to sell it day after to-morrow you will find out all about that. It is a secondhand machine and will sell as such.

Mr. WOODWELL. The point is that such machinery is designed and constructed and installed for a specific purpose, and that it is suitable for that purpose and is not suitable for any other.

Mr. FITZGERALD. I wanted to find out what the proper percentage of depreciation should be.

Mr. CHAPPELL. In that plant that I have referred to that was sold, I examined the engines carefully (the bearings and everything when they were taken out) and they were practically as good as new. They were built twenty-five years ago in the olden days by almost the first man who ever built high-speed engines, and they were in A No. 1 condition. At the same time they brought almost nothing.

Mr. FITZGERALD. That is because we have advanced so rapidly in the sciences that if we could supply modern machinery we would be much better off.

Mr. CHAPPELL. I do not know about that, but even so, that is what that depreciation figured on that plant.

Mr. SMITH. I will submit to be printed, as a part of this record, the transcript of a recent hearing before the Committee on the District of Columbia on the subject of cost of producing electric current.

COMMITTEE ON THE DISTRICT OF COLUMBIA,
HOUSE OF REPRESENTATIVES,
Tuesday, May 5, 1908.

The committee met at 10.30 a. m., Hon. S. W. Smith, chairman, presiding.

**STATEMENT OF GEN. GEORGE H. HARRIES, VICE-PRESIDENT OF
THE WASHINGTON RAILWAY AND ELECTRIC COMPANY.**

General HARRIES. Mr. Chairman and gentlemen of the committee, it is a difficult thing to discuss this measure.

Mr. MURPHY. Who is proposing this bill?

The CHAIRMAN. It was introduced by Mr. Jenkins.

General HARRIES. Mr. Jenkins does not know even whom it was who handed him this bill for introduction. He does not know the man.

Mr. MURPHY. Who is interested in this bill?

The CHAIRMAN. Mr. Cary called it up.

Mr. CARY. I called it up with the object of seeing what the prices were for electric lighting. [To General Harries.] You object to furnishing it at 7 cents per kilowatt hour. You say that you can not furnish it at that price?

General HARRIES. I do.

Mr. CARY. I understand it is furnished to firms in the city at 2 cents.

General HARRIES. It can not be done.

Mr. CARY. You can not furnish it for that?

General HARRIES. No, sir.

Mr. CARY. You object to the appointment of a meter inspector. There is a position here mentioned as meter inspector.

General HARRIES. We had objection to offer to that. It is a little difficult to discuss this thing. Here is a bill that has been framed by a man that wants to be appointed inspector of meters, an office for which the bill provides.

Mr. CARY. Is there any objection to your naming that man?

General HARRIES. I can not name him.

Mr. CARY. Then I do not believe it ought to go in the record. If that man handed this bill to a member of the House for introduction, I want to know who he is.

General HARRIES. I can not give his name.

Mr. CARY. How do you know he is a man looking for a job?

General HARRIES. I have no doubt of that whatever.

Mr. CARY. I did not know that Mr. Jenkins was that kind of a man.

General HARRIES. I went to Mr. Jenkins and asked him about it, and he could not even think of the name of the man. He said: "I have got a notion that he is the man who wants to secure my help in getting him a job of inspector. I have asked my clerk to identify him."

The CHAIRMAN. Have you got any figures of comparison of prices of electric lighting per kilowatt hour in Washington as compared with cities of similar size?

General HARRIES. We have such figures if you want them.

The CHAIRMAN. We want information on that point and have called a hearing for that purpose.

The CHAIRMAN (to Mr. Cary). You can ask him for a comparison of prices of electricity per kilowatt hour in cities of this size.

General HARRIES. I can put in an exhibit showing the rates for commercial lighting in cities of 100,000 and over, and also showing the populations, business houses, residences, arc lighting, power, cost of fuel, and similar articles in order to illuminate the subject generally.

The CHAIRMAN. I have not time to read these things, and I would like to have you make the statement now.

Mr. MURPHY. What is a kilowatt hour?

General HARRIES. It is a thousand watt hours. A kilowatt is one-third more than a horsepower. If you will take the cities in which the gentlemen of this committee are interested, and as far as possible the cities of which you are residents, it can be ascertained. If you take the city of Milwaukee, it is 12 cents and has been for many years.

The CHAIRMAN. Have you got Detroit there? That is a city of about the same population as Washington. I would like to have the equivalent of that.

General HARRIES. The equivalent of that is about 12½ cents.

Mr. TAYLOR. What is it at Columbus?

General HARRIES. It is about 12½ cents.

Mr. TAYLOR. And that is a voluntary act of the company?

General HARRIES. That is the price with coal at \$1.35 per ton.

Mr. TAYLOR. Our coal fields are close.

General HARRIES. As against \$3.50 per ton for coal in this city.

The CHAIRMAN. Give the cost of fuel in connection with each.

General HARRIES. It is in here. I will make it as broad as you want me to make it. At Detroit the price is 16 cents.

The CHAIRMAN. What do they pay for coal there?

General HARRIES. Two dollars and fifty cents per ton.

Mr. CARY. In Washington your price for electricity is 10 cents?

General HARRIES. Yes, sir.

Mr. CARY. Do you not sell it here as low as 2½ cents?

General HARRIES. No, sir. We use anthracite coal here; we do not use any soft coal.

The CHAIRMAN. Some one asked about Toledo. What is the price there?

General HARRIES. Twelve cents.

The CHAIRMAN. What do they pay for coal?

General HARRIES. One dollar and forty-six cents.

The CHAIRMAN. What does Chicago pay?

General HARRIES. Fifteen cents; and it has just been reduced from 20 cents to 15 cents.

The CHAIRMAN. What is the price of coal there?

General HARRIES. It is from \$1.10 to \$2.50.

Mr. CARY. What does the Government pay in Chicago for the post-offices and custom-houses?

General HARRIES. I have not the figures for that, but it is about 4 cents per kilowatt hour.

Mr. CARY. Is it not a fact that the price is gauged by the amount that is used, running down to as low as 2½ cents for 50,000? Do not some people in Washington get it as low as 2½ cents?

General HARRIES. I do not know of anyone who gets it that cheaply.

Mr. CARY. Do you supply the Portland apartment house and the Raleigh Hotel.

General HARRIES. They make their own current.

Mr. CARY. Have they got a plant at the New Willard Hotel?

General HARRIES. They have their own plant.

Mr. CARY. Does it run the year round?

General HARRIES. I do not know.

Mr. CARY. You do not sell current there?

General HARRIES. We may do that when the summer load is on. When they shut down, they take current from us.

Mr. CARY. And that you furnish for $2\frac{1}{2}$ cents?

General HARRIES. Oh, yes.

Mr. CARY. And you make a profit on it at $2\frac{1}{2}$ cents?

General HARRIES. That is the summer service. We have to furnish the summer load in any event.

Mr. CARY. These hotels run for about seven months and use their exhaust steam. For about three months in the summer they shut down their plant, and you furnish them at about $2\frac{1}{2}$ cents?

General HARRIES. That comes at a time when our machinery is virtually idle, and we find it economical to sell it at that price. We can not make it and store it.

Mr. CARY. If you make electric light and power and sell it at $2\frac{1}{2}$ cents are you doing so at a loss?

General HARRIES. No, sir; because the interest on investment is so much.

Mr. CARY. If you can sell it at $2\frac{1}{2}$ cents and not lose anything, why not sell it that way the whole year round?

General HARRIES. There is no trouble about answering that. I can do that by asking you to look at some of these diagrams.

Mr. CARY. I do not know anything about the matter of electricity.

General HARRIES. In doing business that way, we are clearing up and doing business economically and disposing of a product locally which otherwise we would not sell. Mr. Sinclair will explain these and give you the workings of the matter, and I will let him make a statement, perhaps, because he can do it a little clearer than I.

Mr. SINCLAIR. The first diagram here is the one for Saturday, December 1, 1907. The maximum load comes in December. This is the railway and power and lighting for the Washington Railway and Electric Company. This shows the amount of current that is carried. While we have this load we can get along in Washington with perhaps less than one-third of our present capacity. Our load is about thirty-five. It is higher than it is in most cities. We furnish the railway power and the electric lighting from the same plant. For the year round we will require a plant of about 4,000 kilowatts in capacity in the place of the one we have now, or 15,760 kilowatts.

Here is the maximum lighting in one year, 1,200 amperes put out from different substations in the city. Here is the ordinary summer load, which is about 19,000 amperes. Sometimes in the summer it runs down to less than 5,000. All this capacity is for eleven months in the year, and for the rest of the time the plant is practically idle, with the exception of Saturday, when again the maximum piles up sometimes within fifteen minutes. At about 8 o'clock in the evening we are running, say, 36,800 amperes. We have to pile on boiler power in order to reach that load, which stays on perhaps sometimes

for not more than five minutes, and then it will drop, and by 12 o'clock it is below 15,000 amperes.

Mr. TAYLOR. Explain briefly why it is more economical, if you are compelled to have the load, to pile on a lot of contract at a lower figure.

General HARRIES. In doing this business, when we get below a certain amount of current which we can sell, we reduce the price because we have our expenses, interest on our investment, and depreciation, and operating at cost is good business, because otherwise the machinery would be standing idle.

Mr. TAYLOR. Does $2\frac{1}{2}$ cents pay interest?

General HARRIES. It does in summer time.

Mr. TAYLOR. Interest on investment does not vary at any time, does it?

General HARRIES. No; it is the same at all times. When our machinery is idle, it is dull business. We want to make that up as soon as possible by keeping the machinery busy. If we could run at our full rate throughout the year, we could not sell the current at $2\frac{1}{2}$ cents. Almost every city in the United States is selling current in that way. They adopt a sliding scale. We have to stop our station as well as our conduits and cables. Without the load as well as with the load, we have the cost of superintendents and other expenses, and we consider it economical to furnish this current in this way.

Mr. TAYLOR. Have you means of estimating the present cost of current under the conditions you have named, counting everything, rebates (if any) etc.?

General HARRIES. I have not.

Mr. TAYLOR. I think it would be important. This bill is for the purpose of fixing the price of current, and if you know what a fair cost is to your company, taking everything into consideration, it would give us a better understanding as to whether or not the price ought to be reduced.

General HARRIES. I have been waiting to hear from this gentleman who proposes this bill.

Mr. MURPHY. Nobody seems to be fathering this measure.

The CHAIRMAN. Except that some member may come in at the next meeting and propose its passage.

Mr. NYE. Has Mr. Jenkins authorized this?

The CHAIRMAN. General Harries said that he saw Mr. Jenkins and Mr. Jenkins told him that some gentleman had asked him to introduce this measure. I do not understand that Mr. Jenkins is taking any interest in the bill. Mr. Cary called the bill up, and the committee thought, in fairness to the electric lighting company, that they ought to be heard.

Mr. TAYLOR. This bill was filed, and it was just yesterday returned from the Commissioners with their views. The subcommittee examined it and thought a hearing should be had, and so it was set for to-day.

General HARRIES. I will say that many years ago, certainly twelve years ago, perhaps Mr. Sinclair will remember the details, the maximum price was set at 10 cents.

Mr. TAYLOR. It used to be 15 cents.

General HARRIES. Between eight and nine years ago the price was fixed at 10 cents, with coal then selling at the same figure, or relatively the same figure, the country over. It was a little less in other places. That figure was an extremely low rate at that time, but Congress decided that 10 cents was fair, and we proceeded to do business on that basis. We have had to furnish it on that basis ever since, in spite of the fact that in a great many of the cities of 100,000 or more in this country the price of electric lighting is greater, while the price of coal in a great many places is cheaper, than it is here. Then it must be understood that there were features which we had to consider in analyzing the situation and in attempting to reach any conclusion other than the conclusion of the commercial or Congressional fixing of the price to-day in Washington.

Mr. TAYLOR. Is your coal closer here than it is to Columbus?

General HARRIES. There are many mines in the neighborhood of Columbus. The fact is that we are selling to small consumers, people who consume less, at a maximum rate of 10 cents. During the summer months the plant, instead of running one hundred and twenty hours, gets down to about one-fifth of that. Our receipts for current delivered last year was less than 4½ cents per kilowatt hour. The exact figure was 4.6. A little while ago you will remember that in New York they investigated the price of illuminants by a general committee of the senate, and those figures are of extreme interest.

Mr. NYE. I would like to ask if anybody is urging this measure?

Mr. TAYLOR. Mr. Cary called it up.

The CHAIRMAN. If Mr. Taylor or any other member comes in on Thursday and asks that this bill be taken up, of course I do not know of any reason why it can not be done.

Mr. NYE. Is there any reason for decreasing the price? Is there anybody asking that this bill should be passed?

The CHAIRMAN. I suppose that Mr. Cary's opposition is based upon the belief that electricity can be sold as low as 6 or 7 cents in this District.

General HARRIES. I will bring in his own city of Milwaukee to offset that.

Mr. MURPHY. I do not understand this. Nobody seems to be present to urge this matter. Mr. Cary is not doing so. I do not see that anybody else is.

The CHAIRMAN. I do not understand that anybody is interested in this matter. I do not know of anyone.

Mr. MURPHY. I do not.

The CHAIRMAN. The last meeting was the first time that it was broached.

Mr. TAYLOR. At the last meeting of the committee Mr. Cary talked to the chairman of the committee about it and he seemed to take an interest in it and wanted it submitted to the committee. We called the clerk, and he said that it had been referred to my subcommittee. It was sent to the Commissioners on the 13th of February, and the Commissioners sent it back.

Mr. BRODHEAD. What did the Commissioners say about the bill? (The clerk was called upon to read the report of the Commissioners.)

The CHAIRMAN (to General Harries). Do you feel that your company is selling current at as low a price as it can?

General HARRIES. Yes, sir; as low as it can under present conditions. We are selling it lower than it is sold in other cities. If you take the city of Chicago, with its tremendous load of current and its cheap coal, it has just come down from 20 cents to 15 cents. It had been running at 20 cents while we were running at 10 cents. We have high-grade fuel and underground construction.

Mr. TAYLOR. You have underground construction altogether, have you not?

General HARRIES. Our wires were originally put up overhead, but we are taking them down as rapidly as possible, and very few of them now remain.

Mr. TAYLOR. When was the price fixed at 10 cents?

General HARRIES. About ten years ago.

Mr. TAYLOR. There was a bill brought in, and it caused an elaborate discussion on the floor of the House. At that time I remember that Mr. Babcock was chairman of this committee.

The CHAIRMAN. The clerk will read the report of the Commissioners.

Mr. MURPHY. I do not think that under the circumstances it is proper to read that in public, but it should be reserved for an executive session.

Mr. TAYLOR. I do not believe consideration of the bill should be continued further at this time, so I move that it be discontinued.

Mr. MURPHY. If anybody wants to discuss it I am ready to hear him.

The CHAIRMAN. I think that we ought to treat everybody fairly, and I do not think that a Member should be allowed to come in on Thursday and move that the bill be taken up and ask for its passage unless it be given proper consideration.

General HARRIES. If I had believed that this bill would for a moment be seriously considered, I would have never come here this morning with only these few diagrams. I would have come here with a dozen experts who would take the matter up properly, instead of taking a little testimony overnight. I did not believe that this measure would be considered seriously.

Mr. TAYLOR. Mr. Cary was here, but he has left.

The CHAIRMAN. He had to go to another committee. Are there any further questions?

Mr. TAYLOR. I move that the hearing be continued to next December.

Mr. MURPHY. I do not think we should take just that action, because to-morrow the newspapers will be coming out and saying that we are not willing to consider this measure. They will have half a column saying "that the House Committee on the District of Columbia refused discussion of this electric lighting proposition."

The CHAIRMAN. We have, at least, conscientiously tried to get consideration of it.

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